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The Outlook

A 600 m.p.h. "Straw"

COMPLACENCY received a rude shock on February 8th, when the Boeing XB-47 jet-propelled bomber flew from the State of Washington on the American west coast to Washington in the District of Columbia on the east coast, a distance of some 2,290 miles, in 3 hours 46 minutes, or at an average speed of more than 607 m.p.h.

That flight gives a glimpse of what bomber interception will mean in the future. Even allowing for the fact that one does not at the moment know what sort of tailwind helped the machine along, the performance is sufficiently startling to impress the urgency of a revision of tactics on those, some in high places we regret to say, who are still living in the present if not in the past.

It is a sobering thought that the speed achieved by the Boeing bomber represents more than ten miles a minute. It is reported that the machine flew at an average height of about 30,000ft. The Meteor 4 with Rolls-Royce Derwents running at combat rating takes 6 minutes 28 secs. to reach that height. In the meantime the bomber would have covered some 65 miles, a fact which points inevitably to the need for two-seater fighters equipped with the necessary radar and other equipment. Moreover, if the fighter is to be effective for attacking the bomber, once it has contacted it, it must have a speed well above that of the bomber.

The question arises whether such a fighter is a practical proposition. With a lower military load than that of the bomber, the fighter should be a smaller aircraft, and by cramming on power its speed should, therefore, be capable of being pushed up to something greater than that of the larger machine. But until supersonic problems have been solved, both types of aircraft may be limited to the same speed by Mach effect. It may well be that the ultimate solution will have to be guided missiles, but in the meantime we cannot afford not to develop the two-seater fighter.

We started the German war with just enough fighters to save the country. Our bomber production had to wait until invasion had been staved off. It looks as if the position is a great deal worse now.

The Petrol Tax Again

PERSISTENT hammering away usually brings results in the end. It is to be hoped that this will also be found to apply in the case of the demand to have the unfair and unreasonable tax of 9d per gallon of aviation spirit removed.

For months and years attempts have been made to persuade the Chancellor of the Exchequer to abolish this tax, but with no result so far. A new attack was launched on February 9th, when a deputation made representations to Mr. Glenvill Hall, Financial Secretary to the Treasury. Principal spokesman was Mr. E. C. Bowyer, chief executive of the S.B.A.C., and the deputation included representatives not only of that body but of the Royal Aero Club, the Association of British Aero Clubs and Centres, the British Air Charter Association, the Air League of the British Empire, the Air Transport Section of the London Chamber of Commerce, the Joint Air Transport Committee of the Federation of British Industries, the Association of British Chambers of Commerce and the London Chamber of Commerce.

It will scarcely be denied that these bodies represent influential sections of the community, and it will be interesting to see what reply the Chancellor of the Exchequer will make.

The position, as most of our readers will be aware, is that duty is payable only on aviation spirit used in this country. The Corporations which operate to places

abroad do not have to pay this duty. Thus B.E.A.C. is the chief sufferer on its inland routes.

The charter companies are also heavily penalized, and for the flying clubs, struggling to keep their machines flying in spite of every discouragement, the tax is a serious drain on very depleted resources.

Annual consumption on which duty is payable is about 19 million gallons, which represents something like £713,000 per annum in duty. More than 70 per cent of this quantity is used by the aircraft industry for bench tests of engines and for test flying. The result is to increase the cost of engine and complete aircraft at a time when competition is increasing and it is important to keep prices as low as possible in our export drive.

On former occasions it has usually been argued that to abolish the duty on aviation spirit would involve too many complications. The S.B.A.C. submission pointed out that a very simple way would be to lay the onus of securing a refund of duty on the user. This is done in the case of motor fishing vessels which use petrol; they make their claims for refunds through the Customs. It should not be difficult to devise a workable scheme for aviation spirit.

Off the Record

DOES the establishment of officially-recognized world's records have any influence on the development of air transport? The question has been asked often enough, and opinions are still divided as to the answer.

Major R. H. Mayo, O.B.E., has no doubts about it. Last Monday he told the Institute of Transport his reasons for replying with a "yes."

To bring home his point, Major Mayo had to outline the history of the main records: speed, distance in a straight line, distance in a closed circuit, and altitude. Of these, he considered the speed record the most important and pointed out that had it not been for the Schneider Trophy Contests, we might not have had the Spitfire and Hurricane fighters when the war broke out.

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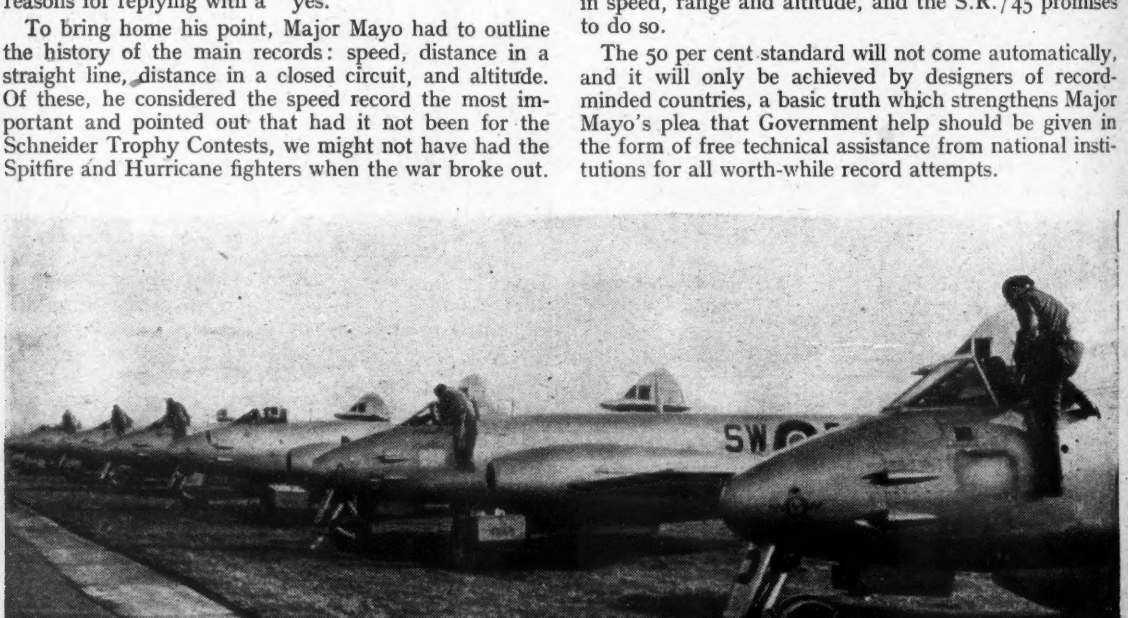
Equally, in modern times, he believes that John Derry's record of 605 m.p.h. over a closed circuit in the D.H.108 will have contributed materially to the development of the D.H.106 airliner.

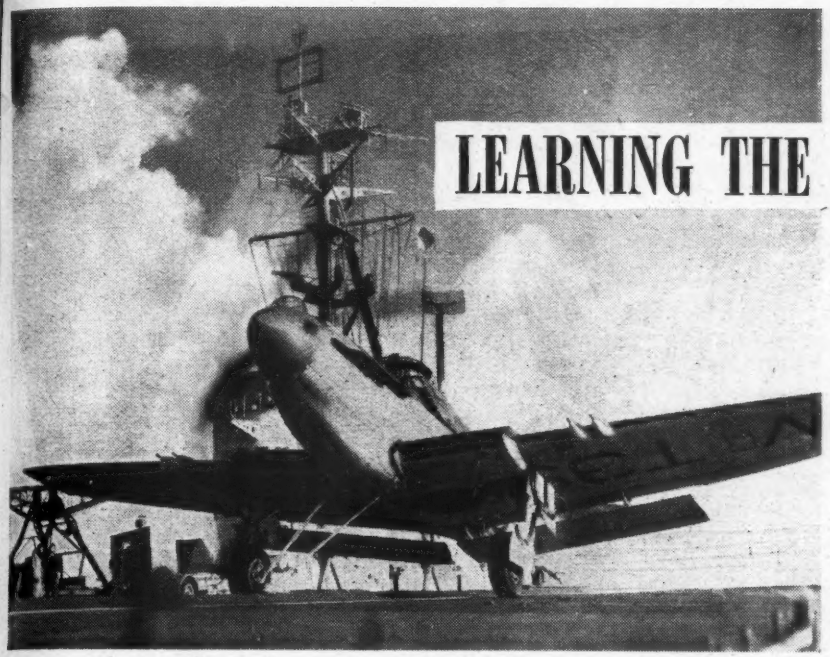
Major Mayo made the very interesting observation that the fastest air transport aircraft have had and will continue to have a cruising speed of about 50 per cent of the world's speed record at any given period, and that air transport operating height is also in the neighbourhood of one-half of the altitude record. This is a point which we do not remember having seen brought out before. Again, cruising range and distance record appear to bear the same 50 per cent relationship (the record at present is 11,236 miles, and the Saro S.R./45 is expected to have a cruising range of about 5,500 miles). As Major Mayo pointed out, it takes a very good all-round aircraft to achieve the 50 per cent figure in speed, range and altitude, and the S.R./45 promises to do so.

The 50 per cent standard will not come automatically, and it will only be achieved by designers of record-minded countries, a basic truth which strengthens Major Mayo's plea that Government help should be given in the form of free technical assistance from national institutions for all worth-while record attempts.



"Flight" photograph.

RESURRECTED: The line-up of Meteor 4s, each bearing its new crest, on Friday last when No. 43 (Fighter) Squadron was re-formed by re-numbering No. 266 (Rhodesia) Squadron. The ceremony was held at Tangmere, where No. 43 will revive its pre-war partnership with No. 1. The station is commanded by W/C. G. S. A. Parnaby. An account of the ceremony appears on page 205.



LEARNING THE HARD WAY

Deck-landing Trials with Australia's First Carrier

With flaps at take-off setting and engine wound up to full boost and r.p.m., a Firefly 5 from the Carrier Trials Unit is here seen immediately prior to being catapulted off H.M.A.S. Sydney.

ON Monday morning, February 7th, H.M.A.S. *Sydney* lifted her hook from the Man of War anchorage, Spithead, and moved off down the Eastern Approach channel. A week's programme of deck-landing trials for the first aircraft carrier in the Royal Australian Navy had started.

As we steamed down to the Nab Tower our attendant destroyer, H.M.S. *Contest*, could be seen ahead, and in the young sunlight the white face of Culver Cliff stood out in high relief against the shadowy haze of the land behind. It was a lovely, calm, bright morning with 5/10 cloud dappling a washed blue sky and sending shadow patches over the sea in random patterns of dark grey-green and pale emerald. There was an eagerness and an air of expectancy aboard, for to many of the ship's company the operation of aircraft at sea was a new experience, and they were now to put into practice the lessons they had so assiduously been learning.

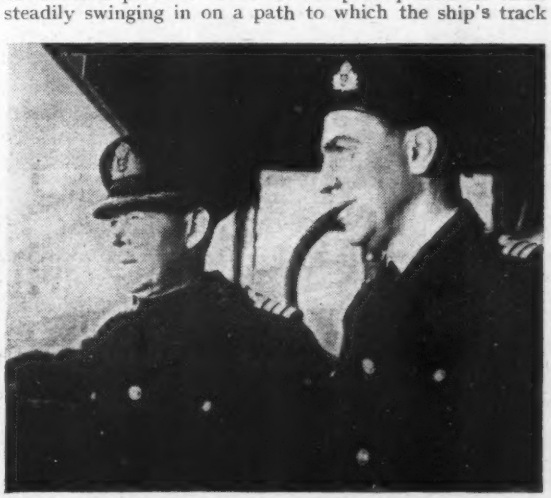
A light fleet carrier of the *Majestic* class, H.M.A.S. *Sydney*, was handed over to the Australian Government and commissioned on December 16th (*Flight*, December 30th, 1948), and is now undergoing working-up trials. She is to be equipped with twelve Sea Fury 11s and twelve Firefly 5s, which will respectively form 805 and 816 Squadrons of 20 Carrier Air Group. Under Captain R. R. Dowling, D.S.O., R.A.N., the ship's executive officer is Cdr. O. H. Becher, D.S.C. and bar, R.A.N., whilst the flying side of operations is directed by Cdr. R. J. H. Stephens, R.N. The ship's Carrier Air Group is commanded by Lt. Cdr. P. Whitfield, D.S.C., R.N., whilst the two squadron commanders are Lt. Cdr. P. E. I. Bailey, R.N. (805), and Lt. Cdr. C. J. Coxon, R.N. (816).

Whilst the ship was still in the Royal Dockyard, Devonport, Sea Furies and Fireflies were hoisted aboard so that the aircraft hands could gain some experience of dealing with these types. Nevertheless, although a degree of familiarity with the job in a semi-static sense can be valuably obtained in this manner, there is no doubt at all that the only way in which the crews can learn the full extent of their duties is by the hard road of full-dress operation. It was for this reason, among others that we were steaming out into the Channel.

At 0905, from the goofers (the gun platform abaft the island) we saw our first aircraft—a Seafire 17 and Sea Fury 11—approaching from astern and flying at about 80ft. They passed close to starboard and started circling. From the Commander (Air) orders brayed out from the bullhorns, the loudhailers set along each side of the flight deck, and things began moving. Our escort destroyer was too close astern, and was signalled to alter station; we changed course to bring the wind true along the deck, the radio masts were swung from the vertical to the horizontal, a single white panel in the deck was exposed to indicate that we were prepared to take single-seat aircraft, and then the feeling of expectancy grew even more charged as the remaining six aircraft of the trials flight appeared.

First Landings

Everything being in readiness, and with the "F" flag of the International Code proudly streaming for the first time from the port yardarm, to indicate that we were operating aircraft, the batsman held his bright orange ribbon-bats high and wide as the first Seafire came curving in. From a position broad on the port quarter he came steadily swinging in on a path to which the ship's track

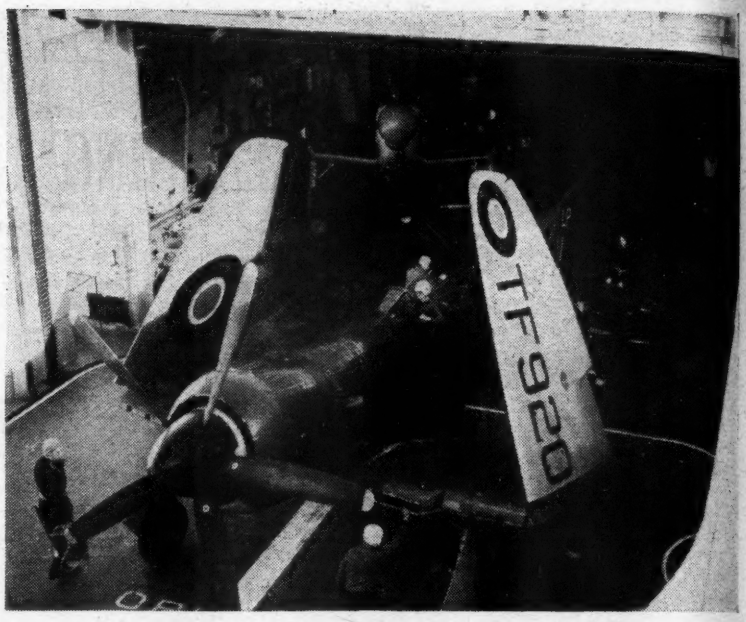


Captain R. R. Dowling, D.S.O., and Cdr. R. J. Stephens watch operations from the flight control bridge.

Learning the Hard Way . .

was a tangent, smoothly losing height in a perfectly timed approach. On the batted "cut" the Seafire dropped, his hook catching No. 1 wire, and rapidly jerked to rest. The deck crew leaped across, freed the hook, latched it up and the first aircraft to "land-on" *Sydney's* deck—at 0915 hrs—taxied forward and parked. The second Seafire was followed by the two Sea Furies, Fireflies and Avengers, the last aircraft landing at 0931; thus the eight aircraft had been handled in sixteen minutes.

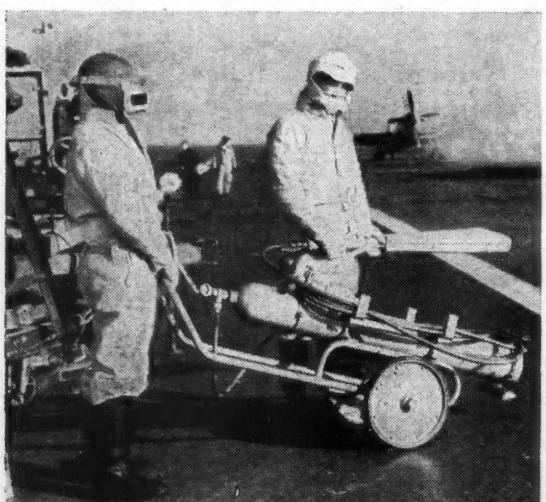
Cdr. Stephens put in a good deal of time at the microphone and had the deck crews on the jump. But they were keen, they were willing, they had bags of spirit, and the improvement at the end of even the first day's flying was quite astonishing. However, quite aside from the tuning-up operationally, the trials had the equally important function of providing tests for the arrester wires, crash barriers and catapult. To this end the trials aircraft provided nicely graduated weights from the Seafires at 7,650 lb up to the Avengers at 16,000 lb. By the use of pressure gauges and velocity recorders in the arrester and catapult gear, the radar and photographic determination of aircraft landing and take-off speed, and, in addition, the evidence of accelerometers and decelerometers fitted in the aircraft, the essential factors for equating the operational efficiency of the gear could readily be obtained. It was required, for these tests, that each of the first six arrester wires should be pulled out twice, but any exercise of the crash barriers would, of course, be fortuitous.



Wings folded and in careful hands, a C.T.U. Sea Fury II is wheeled from the forward lift into the hangar past one of its companion Firefly 5s.

Trials Flight Personnel

The trials flight came, of course, from the Naval Air Sea Warfare Development Unit/Carrier Trials Unit at Lee-on-Solent and was composed as follows: Seafire 17s, Lts. J. Marsland and J. Lowder; Sea Fury IIs, Lt. G. C. Baldwin, D.S.C. and bar, and Lt. Cdr. W. R. MacWhirter, D.S.C. (C.O.); Firefly 5s, Lts. R. L. Turnbull, M.B.E., and D. W. Morgan; Avenger 3 T.B.M.s, Lt. P. C. S. Chiltern and Lt. Cdr. Jon. E. Thomas, U.S. Navy. The last-named officer is on reciprocal "Lease-Lend" and has served with the C.T.U. since last November; he was made an O.B.E. whilst serving in H.M.S. *Victorious* in the Pacific during 1943.



Fully prepared for trouble, the Sydney's deck fire-teams were fortunately not called upon to work very hard.

Toward mid-morning the sky clouded over to a general occlusion, and at a position roughly 12 miles south of St. Catherine's Point, we steamed at about 2 to 3 knots, just enough to give steerage way, as the wind over the deck was about 30 kt. and to have increased this would have meant for test purposes having the aircraft landing too slowly relative to the ship.

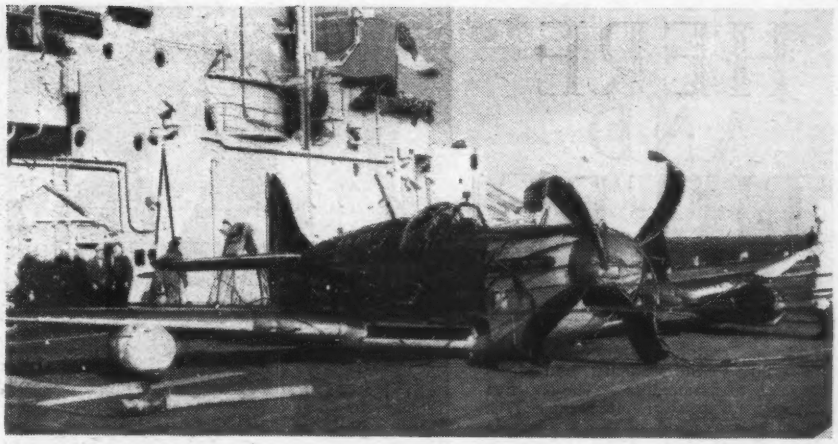
Whilst the trials pilots had some tea, or maybe it was coffee, the aircraft had been lowered into the hangar with the exception of one Seafire. This machine, flown by Lt. Marsland, then did a series of seven take-offs and landings. Without using the full 690ft of length of deck for the take-off run, in fact, only about 420ft of it, the Seafire would run up against the brakes, then, on release, would accelerate at full boost, the tail lift rapidly whilst the torque reaction listed the aircraft, so that the starboard tyre flattened slightly whilst the port tyre seemed only to skim the deck. Then round he would go in a left-hand circuit to come in again for the next landing. In actual fact, the pilot did a very nice job here in collecting wires Nos. 1, 3, 2, 4, 5, 5 and 6.

The next series of flights were performed by Lt. Lowder in the second Seafire, and provided the first exercise of the catapult. The technique of getting into position on the end of the catapult is rather interesting. The aircraft is taxied up to the forward lift and swung diagonally so that the starboard wheel runs along a white line painted across the lift platform. Baulks of timber laid parallel with the catapult track but staggered in fore and aft position form stops respectively for the starboard main wheel and the tailwheel. Thus, when the starboard wheel meets the lump of wood, the aircraft is swung until the tailwheel rests against the second baulk: retractable flap-type chocks hinged in the deck limit forward travel of the aircraft. The strop around the catapult trolley is then engaged with the hooks under the forebody of the aircraft, whilst the retaining strop is clipped to the spigot in the aircraft's tail.

For those who have never seen a catapult take-off before, the operation is not only interesting but decidedly impressive. At wind-up signals from the deck control officer, the pilot opens the throttle to full boost, the flap chocks snap shut and, with the pilot's raised-hand signal that he is ready, the catapult is released, the retaining strop falls, and the aircraft is accelerated to an air speed of about 70 kt. in a distance of roughly 130ft.

Originally, of course, the term catapult was used for the cordite-charged launching devices fitted to cruisers and battleships, and the term "accelerator" was used to define the compresser-air launching system employed on aircraft carriers. However, with the obsolescence of the true catapult, the term has now been resurrected to apply to the accelerator. The

system used is not unlike a reversal of that employed for the arrester gear. The principle is oleo-pneumatic and comprises the use of a compressed-air ram which, through a system of ropes and sheaves, gives a movement ratio of 10:1 that is to say, for a 12in movement of the ram, a 10ft movement is imposed on the trolley. Ram pressures vary according to the aircraft weight and launching speed desired, but are nominally of the order of 2,400 lb/sq in, the ram movement displacing the fluid (glycerine and water) into an accumulator with a static air pressure of approximately 100 lb/sq in. The energy stored in the accumulator by the take-off impulse serves to return the trolley to the launching end of the catapult. The retaining strop, by means of which the aircraft is held back, incorporates a shear pin in the attachment fitting, which is designed to break at about 1g, when the trolley has moved perhaps 6in, and so release the aircraft for take-off.



This unfortunate arrival was the result of an unexpected visit by one of Sydney's own Fireflies from Eglinton. No one was hurt and, on the credit side, it did afford a useful test of the crash barriers.

In the arrester-wire gear it is, of course, the aircraft which provides the source of energy, the pull-out action of the wire, through a multiple system of ropes and sheaves, causing the ram to displace fluid into the accumulator: the movement ratio in this instance is 12:1. Control valves in the ram/accumulator pipe line permit variation of flow restriction to bring about the arresting deceleration required, and the ropes are so fleeted that automatic compensation is provided for an off-centre pick-up. For example, when an aircraft lands-on to port or starboard of the deck centre-line, the unequal pull on the arrester wire is compensated and corrective resistance imposed, tending to straighten the aircraft's roll path.

In the early afternoon, after Lowder had completed his eight take-offs and landings, the commanding officer of the Carrier Trials Unit, Lt. Cdr. W. R. MacWhirter, D.S.C., started his series of flights in one of the Sea Furies. It was particularly interesting to see a very clearly defined vortex streaming from the starboard wing-tip during the final approach and in fact still evident when the aircraft was on the wire, only vanishing seemingly but a moment before the Sea Fury came to rest.

First Man: First Prang

The first "incident" of the trials occurred at MacWhirter's third landing-on. He came in just a trifle too low, so that the dangling arrester hook struck the round-down, rebounding violently enough to burst the snubber and crumple the base of the rudder, so that, with all damping gone, the hook just bounced over the wires and the aircraft came motoring on up the deck. Fortunately, the hook caught the last (10th) wire, but although the last two wires are restricted to a pull-out some 15 to 20 per cent less than the first eight wires, which can be pulled out well over 100ft, this was not sufficient to prevent the aircraft running into the first crash barrier. In point of fact, little damage was done: the airscrew blades got a little bent and the paintwork got scratched a bit, but otherwise there was little hurt.

It was rather amusing to see the reaction of the deck crews. They mostly seemed rooted to the spot with interest, and it was not until the Commander (Air) got to work with the microphone and klaxon that they became galvanized into activity. Orders brayed from the bullhorns and, in no time at all, the barriers were lowered and the aircraft wheeled to the lift and taken below. Some of the C.T.U. pilots, who were goofing with the writer, suggested that, had the deck crew been fully experienced and on their toes, the first barrier would have been lowered when it was seen what was happening, and the aircraft thus been brought to rest without damage; alternatively, had it not engaged the wire, the second barrier would have stopped it.

Following this minor excitement, one of the Fireflies was brought up and prepared for catapult take-offs. Lt. Morgan was the pilot and he did five take-offs and landings. In point of fact, on his second landing we very nearly had a repetition of the Sea Fury incident, in that the Firefly touched down late and somehow managed to miss the wires until it finally engaged the ninth and was stopped only a few feet short of the first barrier. Blood pressure a trifle higher than normal, we concluded flying at 4.10 p.m., and steamed back to Spithead.

Tuesday, February 8th, dawned as a perfect day and subsequently maintained its early standard. As we proceeded to sea, accompanied by *Contest*, we also had the company of H.M.S. *Warrior*, a sister carrier, together with her escort destroyer. She kept station with us to our operating position to the southward of the Isle of Wight, watched our first take-offs and then went home.

Lt. R. L. "Junior" Turnbull, M.B.E., did the first take-off of the day in a Firefly, being shot off from the catapult at 0946. He was closely followed by Lt. Baldwin in the second Sea Fury which, with a duff boost control, was being taken back to Lee-on-Solent to be exchanged for another. After his fourth catapult off, "Junior" Turnbull circuited and then, at 1008, came in to a perfect touch-down for his 1,400th carrier landing. He raised his locked hands over his head and shook them, whilst the bullhorns informed the ship. He then did a further catapult take-off and landing for good measure, and then came into the ready room looking decidedly jaded. He *hates* being catapulted.

Lt. Morgan then took over and did a further three catapult take-offs, and then the Commander (Air) decided that he would have a go, so he climbed into the Firefly and was squirted off. Following this, one of the Avengers was brought up from the hangar with a concrete dummy torpedo to give an all-up weight of 16,000 lb.

Cirrus and cirro-stratus gauzed the deep blue of the sky whilst strato-cumulus hung like a roof over the land away to our starboard beam. With a wind blowing out of the west true along the flight deck at about 25 kt., the ship lay gently rolling to the slight swell, whilst the effulgent sunlight turned the sea to port into a plangent spread of molten silver.

Lt. Cdr. Thomas, the "Lease-Lend" American pilot, was catapulted off in the Avenger, and, after each landing, as the hook was cleared, he opened the torpedo-bay doors to allow the deck crews to check the torpedo slings and, in addition, to permit the escape of petrol fumes which tend to collect in the bay. On his third touch-down, Lt. Cdr. Thomas came in and caught wire No. 8 slightly off-centre to starboard. The terrific kinetic energy of 16,000 lb of aircraft travelling at about 60 kt. takes some dissipating, and the fact that the Avenger caught the eighth wire, coupled with the aircraft's 54ft wing span, aggravated the conditions. The starboard wing-tip scraped the body of the crane abaft the island, swinging the aircraft even farther to starboard; the Avenger stopped before collecting the barrier, so the only damage was to the wing. Poor Thomas sat in the cockpit literally shadow-boxing with irritation. It was particularly unfortunate, for it was the first time he had ever even scratched an aircraft in some 353 deck landings.

The value of these flight trials in tuning-up deck personnel could scarcely have been better illustrated. After only one day's experience, plus the incisive exhortations of Cdr. Stephens, the improvement in their work was quite astonishing. With true naval smartness, they were on the job in no time at all with the fire teams standing by with hoses and

(*Continued on page 206*)

HERE AND THERE

Whittle Goes South

LAST week A. Cdre. Sir Frank Whittle paid a visit to the South Coast. At Air Service Training, Ltd., Hamble, he gave a talk to the students, who represent some 20 nationalities. The occasion also marked a special reunion, since G/C. Barton, commandant of A.S.T., was in command of the Boys' Wing at Cranwell when Sir Frank was a boy there in 1926. Whittle was one of 100 to be recommended for a cadetship, but the Air Ministry was not impressed, and but for the efforts of G/C. Barton and Mr. H. A. Cox, who was headmaster of Cranwell, Whittle would have been turned down. Sir Frank said to the A.S.T. students: "Though I don't say that if I had not got my cadetship there would have been no jet engine, there certainly wouldn't have been a Whittle jet engine."

Sir Frank also visited Cowes to inspect the huge Saunders-Roe flying boats; he was shown around by Capt. Clarke and Mr. Perfect.

Ex Camera

ON Friday evening, February 11th, some 200 employees and guests of the Williamson Manufacturing Co., Ltd., foregathered at the Holborn Restaurant for the company's annual dinner-dance.

During a speech, it was mentioned that there are no fewer than 60 employees of the company who have served for ten years or over, and of that number, one man had 36 years, one lady 25 years, six had 15 years, and 41 had ten years and over. A remarkable record in its relation to the size of the company.

Mr. C. M. Williamson, C.B.E., F.R.P.S., remarked on the excellent progress made during the past year, and in reference to his trip to America and Canada last year said that, although it was true that the company was first in the field with aerial photography in 1915, it was not until one went abroad that one realized the real meaning of a world reputation. Incidentally, Mr. Williamson took a film with him to the U.S.A. whereby he was able to prove that his father, the founder of the company, originated kinematograph feature films.

The Canadian branch of the company is doing very well and dealings with Holland, Belgium, Switzerland, Turkey and South Africa have produced excellent results.

COSMOPOLITAN: On the occasion of his visit to Air Service Training, Sir Frank Whittle was photographed in the Club ante-room chatting with students of many nationalities. India, Egypt, Finland, Norway, Ceylon and Palestine Arab are represented in this photograph.

JET GEN: A. Cdre. G. W. Tuttle (left), the R.A.F.'s Director of Operational requirements, discusses the Chinook turbojet (seen in background) with the chief designer of Avro Canada's gas turbine division, Mr. Winnet Boyd, during a recent visit to the Company's factory at Malton, Ontario.

Navigation Aid in Burma

FOLLOWING the successful testing of the radio aids to navigation built by International Aeradio and leading British firms for Burma, referred to in *Flight*, January 20th, this equipment was formally handed over to the Burmese authorities at Bovingdon Airport on February 14th. After the handing over ceremony the radio equipment was dismantled and loaded into a specially chartered Skymaster in which it is to be flown to Rangoon, taking off from Bovingdon on February 18th. The total shipment to Rangoon weighs approximately 7 tons and has cost over £40,000. On arrival at the International Aeradio station at Rangoon the equipment will be distributed and installed on the 12 airfields for which it is destined by International Aeradio, who have sent engineers from this country to supervise the assembly and installation.

Research Department Appointment

SIR BEN LOCKSPEISER, M.A., M.I.Mech.E., F.R.Ae.S., Chief Scientist to the Ministry of Supply, has been appointed Secretary of the Department of Scientific and Industrial Research and will take up this post when Sir Edward Appleton resigns on April 30th to become Principal and Vice-Chancellor of Edinburgh University. During the war Sir Ben Lockspeiser was Director of Scientific Research in the Ministry of Aircraft Production and later Director-General of Scientific Research (Air) at the Ministry of Supply. He was appointed to the newly created post of Chief Scientist to the M.o.S. at the end of 1946.

A.T.C. Cadet's World Tour

CADET SERGEANT FORTEATH, of an Edinburgh A.T.C. Squadron, described his recent air tour of R.A.F. stations in the Middle East and Far East as the most thrilling experience of his life. He was nominated by Reserve Command when Air Marshal Sir Leslie Hollinghurst, Inspector-General of the R.A.F., offered to take a cadet with him on a tour to overseas units of the

HERE AND THERE

R.A.F., which began on January 19th and ended on February 8th.

Winter "Lift" an Outstanding Achievement

ADDRESSING members of the U.S. Air Force at Burtonwood on February 3rd, Mr. Arthur Henderson, the Secretary of State for Air, paid a tribute to the work of their Service on the Berlin Air Lift. He stated that the "battle of the winter" was nearly won —an outstanding achievement which it should be possible to surpass during the summer months.

D.H. Technical Appointments

FOR some years the chief stressman of the de Havilland Aircraft Company, Mr. R. H. T. Harper, A.F.R.Ae.S., has now been appointed chief structural engineer. This is a new technical appointment at de Havilland's. Mr. Harper has for some time been responsible not only for the Stress Office but also for the Structural Test House, the High Altitude Chamber and associated activities. Mr. Harper, whose career has from its earliest days been devoted to stress analysis, joined D.H.'s in 1937. Mr. A. W. Torry, A.F.R.Ae.S., has been appointed chief stressman and, under Mr. Harper, takes charge of the Stress Office. Mr. Torry also joined de Havilland's in 1937.

Mr. R. H. T. Harper, A.F.R.Ae.S., and Mr. A. W. Torry, A.F.R.Ae.S.

U.S. Helicopter Tour

A STANDARD Hiller 360 Helicopter left San Francisco on January 24th for what is claimed to be the longest cross-country flight ever undertaken by a commercial aircraft of this type. Scheduled to last over two months, the tour will cover most of the United States, and is intended to demonstrate the utility and dependability of tue helicopter to both Government and civilian circles. The Hiller 360, which is now in production, is powered by a 175 h.p. Franklin engine, and cruises at 85 m.p.h.

Useful Suggestions

SUGGESTIONS submitted to United Air Lines by its employees during 1948 will, it is estimated, save the company nearly a quarter of a million dollars. During the year an average of one out of every two of the 10,000 employees submitted suggestions and approximately one-quarter of the 5,740 suggestions submitted were adopted, for which cash awards totalled $23,500.

PRIZE FLIGHT: Douglas Moore, an ex-Gloster Aircraft apprentice, was taken for a flight in the Meteor 7 trainer as a special award to the best apprentice in 1948. In this photograph he is seen with S/L. Waterton (left) and Mr. K. Watson, Apprentice Supervisor (right). The flight lasted about 30 minutes.

News in Brief

THE Ministry of Civil Aviation announce that Mr. G. S. Lindgren Parliamentary Secretary to the M.C.A., has appointed Mr. A. H. K. Slater to be his private secretary. Mr. Slater was born in Aberdeen and served during the war as a gunner.

* * *

H. R. Matthews, previously assistant to the general manager of Trans-Australian Airlines, has resigned to take up a position as general manager of the Travel Division of Ansett Transport Industries, Ltd.

* * *

A B.C.P.A. DC-6 on charter to Trans-Australian Airlines broke both the Sydney to Brisbane and the Brisbane to Sydney records on the same day. The distance between the two cities is 471 miles and on the outward journey this was covered in 1 hour 34 minutes and on the return trip in 1 hour 47 minutes.

February 8th marked the 30th anniversary of the London-Paris air service, claimed to be the world's oldest regular service. The first crossing took place in 1919 with a Forman-Goliath carrying 15 passengers; the journey took 2½ hours.

* * *

The General Electric Co., Ltd., has recently announced the appointment of Mr. O. W. Humphreys, B.Sc., F.Inst.P., A.M.I.E.E., as manager of the Wembley research laboratories. Mr. Humphreys joined the staff of the laboratories in 1925 and during the war was engaged on heating problems connected with Fido installations at airfields.

* * *

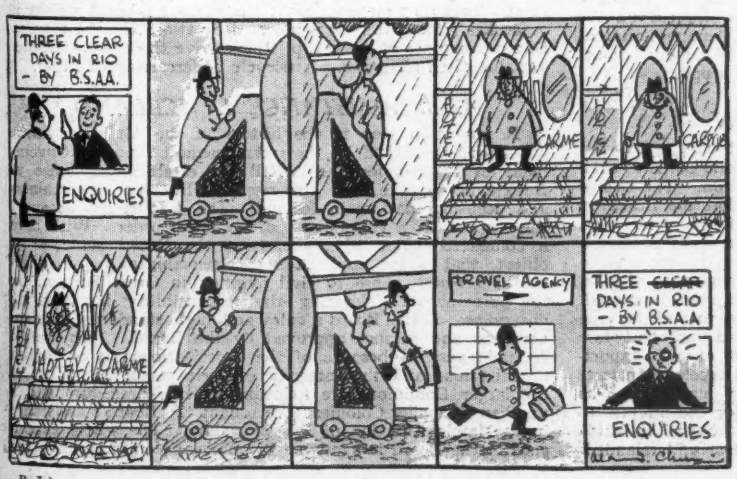
The Hunting Aviation Group in Canada has announced the formation of a new air survey company to be known as Photographic Surveys (Western), Ltd., with offices in Vancouver. The new company will engage in all phases of air survey including air photography, map making and aeromagnetic surveying.

* * *

Temporary permission has been granted by the U.S. Civil Aeronautics Board for United Air Lines to assist in the movement of military cargo between Air Force bases and cities served by the company. Application to serve these bases was made last November when the needs of the Berlin Airlift curtailed the military services' domestic operations.

* * *

Pilots have been warned by the M.C.A. in *Notice to Airmen No.* 474 that a captive balloon, used for naval gunnery training is being flown southeast of the Isle of Wight. This area has already been designated "Hazardous to Aviation" and the balloon, which cannot be close-hauled, is at a height not exceeding 1,000ft. By night it is flown in the vicinity of Bembridge but carries no lights.



SHANNON AIRPORT : In the foreground of this photograph of Shannon Airport can be seen the marine air base, which has not yet been completed. Situated on the estuary of the River Shannon, this marine base has not been fully developed and, in fact, work on it has been shelved owing to the preference for land-based aircraft shown by transatlantic operators.

CIVIL AVIATION NEWS

Airline Operations in 1947/8 : New London-Sydney Route

LONDON'S AIRPORTS

PROGRESS of the work of developing and extending London Airport has been reported in some quarters as being behind schedule. Certain delays have been occasioned, according to the Ministry of Civil Aviation, by the fact that they have no priority claims on building materials or manpower. Whilst undoubtedly the final permanent airport buildings and extended runway system on the north side of the Bath Road must of necessity be a long-term project, it is planned to have the interim terminal buildings, at present being constructed in the centre of the airfield, completed in time for the Festival of Britain in 1952. The term "interim" as applied to these buildings is perhaps apt to be misleading since there is every likelihood that the interim period will extend over about ten years. The whole question of airports in the Metropolitan Control Zone is, of course, under constant review by the Ministry of Civil Aviation and as part of this review the problem of an alternative airport to Northolt is under consideration, although contrary to some reports no decision regarding the future terminal of Continental services has been reached. One of the disadvantages of Northolt is its proximity to London Airport and the fact that it is situated on the remote side of London from the Continent. Amongst alternatives Fairlop is being considered since it is in a more favourable situation for operations to and from Europe.

RUNWAY AT FILTON

IN a letter to the *Sunday Times* of February 13th, Mr. R. H. H. Macaulay of the Bristol Aeroplane Co. Ltd. comments on the size of the new runway at Filton. The size of this runway is apt to give the impression that the Brabazon requires a runway length of 3,000 yards for take-off. Mr. Macaulay points out that the aircraft should clear the hypothetical 50ft barrier laid down in the airworthiness requirements in a distance of 1,100 yards from the beginning of take-off run. The whole length of the runway is, of course, required, not for the actual take-off run, but for the various taxying and acceleration tests which the Brabazon will undergo before making its first flight. In a national project of such importance as the Brabazon extensive taxying and acceleration tests must be undertaken and with a large safety margin such as the new runway offers it will be possible for the aircraft to include in its ground test runs several short "hops" in which it would be lifted from the runway a few feet and relanded. Such trials would enable the pilot to obtain the feel of the power operated controls and the aircraft's response thereto before being committed to the first full flight.

FRENCH TRANSPORT'S FIRST FLIGHT

PILOTED by M. L. Bourrieau, the C.M. 100 twin-engined transport built by Etablissements Fouga et Cie, made its first flight at Aire-sur-Adour airfield on January 19th. The take-off run was less than 250 metres (820ft) and the aircraft on landing stopped in about 300 metres (980ft) after the point of touchdown. These figures will enable the C.M. 100 to use a wide variety of airfields. The loading specification of the C.M. 100 allows for the transport of 2,000 kgs (4,400 lb) of freight or 18 passengers for a distance of 500 kms (310 miles), or alternatively 1,600 kgs (3,500 lb) of freight or 14 passengers for 1,000 kms (621 miles), or again, over a distance of 1,500 kms (931 miles), 1,200 kgs (2,600 lb) of freight or 11 passengers can be carried. Entrance to the aircraft is by means of doors at the front of the fuselage which arrangement is convenient for entry of passengers, a variety of cargoes, or both. Leading particulars of this new French transport are: Wing span, 26 metres (85ft), length 17 metres (56ft); the normal take-off weight is 7,300 kgs (16,093 lb). It is powered by two SNECMA type 12 SO_2 201 engines of 1,200 h.p. which drive three-bladed Ratier variable pitch airscrews. A tricycle undercarriage is fitted.

A.R.B. ASSISTANCE IN ICELAND

AN important step in the history of the Air Registration Board is marked by the recent request from the Government of Iceland for the A.R.B. to establish an office in Reykjavik to take over the responsibility for airworthiness and licensing matters in Iceland. The A.R.B. has accepted this request as a compliment of no mean order. With only a comparatively small organization the Board achieves its object, that is the application of airworthiness requirements in the broadest sense to civil aviation in Great Britain, by the principle of delegating the responsibility for ensuring observance of the Board's rules and high standards to organizations and persons approved by the Board. This system is made possible because of the conscientiousness of British organizations and the integrity of their personnel. Most of the larger Dominions are following A.R.B. procedure and a number of smaller Colonies have sought the Board's assistance in the implementation of this procedure. The whole experience of the Board is available to smaller Colonies through the

medium of its local representative. That Iceland should have been the first country outside the British Commonwealth to request the establishment of an A.R.B. office clearly reflects the high esteem in which British standards as set and pursued by the A.R.B. are held. It may be assumed that the A.R.B. representative in Reykjavik will be fully occupied since in addition to the international air traffic, the Icelandic Register of Aircraft includes a total of 45 aircraft comprising 23 different types.

PROVING FLIGHTS FROM CEYLON

AIR CEYLON, in association with Australian National Airways, started a new air service between London and Sydney via Colombo on February 7th with a proving flight between Colombo and Sydney and another the following day between Colombo and London, both using Skymasters. The weekly return service comes into full operation on February 26th, operated by four Skymasters, and the complete flight will take six days, stopping at Rome, Cairo, Karachi and Colombo (where night stops will be made on the London-Sydney flight), Singapore and Darwin. On the Sydney-London flight, night stops will be made at Singapore, Karachi and Rome. Control at the London end is in the hands of the Transpacific Passenger Agency.

AER LINGUS CHANNEL ISLANDS SERVICE

BEGINNING on June 5th Aer Lingus will start a weekly service from Dublin to Jersey to run throughout the holiday season. This new service will include a round trip flight each Sunday leaving Dublin at 9 a.m. and reaching Jersey at 11.15 a.m. The return flight will leave Jersey at 12.15 p.m. and arrive at Dublin at 2.35 p.m. Fares charged will be £10 single and £18 return. This new service will prove most useful for Irish holiday-makers who will be able to make in less than 2½ hours a journey which previously took nearly as many days. For the convenience of those wishing to travel from Ireland to Brittany the Channel Islands service will connect with the B.E.A. service between Jersey and Dinard. Irish passengers using this service will reach Brittany in just under three hours flying time although the timing of the service will allow them to spend some hours in Jersey between flights.

In conjunction with Aer Lingus, the Irish Department of Posts and Telegraphs on February 2nd opened an air mail service to Britain and the Continent at a lower rate than was previously charged. Air mail letters to Britain from Ireland may now be sent for 3d for two ounces instead of 4½d. Continental letters will now cost 3d for one ounce plus 2d for each additional ounce, while postcards may be mailed for 2d. Mr. J. Everett, Minister for Posts and Telegraphs handed the first sack of mail to Aer Lingus's senior pilot, Capt. T. Hanley to inaugurate the new service. A tribute was paid recently to the Irish airline by Professor L. W. Pollak, of the School of Cosmic Physics, Dublin Institute of Advanced Studies, in a lecture at University College, Dublin, on the Exploration of the Upper Atmosphere. The great safety record of Aer Lingus, he said, was due to the skill of Irish pilots and the precautions taken by the Company, coupled with an excellent meteorological service.

British Airline Statistics (1946/7 and 1947/8)

DETAILED operating and traffic statistics for the three British airline Corporations for the financial year April, 1947, to March, 1948, have been issued by the Economics and Intelligence Division of the Ministry of Civil Aviation. In addition to the series of statistical tables setting out the operations of the various Divisions of the three Corporations, the M.C.A. have also issued a table giving comparative figures for the scheduled services during the financial years 1946-7 and 1947-8. From this comparative table, reproduced below, it can be seen that British European Airways returns represent the biggest increase of the three Corporations. For example, the revenue aircraft miles flown in 1947-8 were over 12 million compared with the previous year's figure of slightly over 3 million. Similarly, the revenue passenger miles flown increased from a figure of approximately 30 million to over 122 million. B.E.A. also showed corresponding increases in the mail and freight (including excess baggage and diplomatic mail) carried, the actual figures being: Mail 1,390.9 tons compared with 453.5 tons the previous year, and freight 3,022.7 tons as against 805 tons.

B.O.A.C. carried fewer revenue passengers in 1947-8 than were carried in 1946-7 although the aircraft miles flown showed a slight increase. Besides a decrease in the number of revenue passengers carried, the freight also showed a decrease from 2,182.2 tons in 1946-7 to 2,087.4 tons in 1947-8. The mail statistics, however, showed an increase in the carriage of this form of cargo.

Although B.S.A.A. figures indicate that the aircraft miles flown in 1947-8 showed a considerable increase over the previous year and also that approximately double the number of passengers were carried, the passenger load factor decreased to 54.4 compared with 65.7 the previous year. This is accounted for by the fact that in 1946-7 the available seat-miles flown amounted to 47,904,902 whereas in 1947-8 the available seat-miles flown were considerably higher at a figure of over 92 million. It is interesting to note that the total number of revenue passengers carried on all services of the Corporations showed an increase of 49.9 per cent and also that the revenue freight ton-miles performed by all services increased by 59.7 per cent.

Services	Financial Year	Revenue Aircraft-miles flown	Revenue Passenger-miles flown	Revenue Passenger-Load-factor	Revenue Passengers Carried	Revenue Cargo (tons) Carried		Revenue Ton-miles performed				Overall Revenue Load-factor
						Mail	Freight*	Passenger	Mail	Freight*	Total	
British European Airways	1946–7	3,183,868	30,034,967	67.9	71,134	453.5	805.0	2,703,851	307,323	476,743	3,487,917	64.1
	1947–8	12,465,434	122,475,237	69.3	511,522	1,390.9	3,022.7	10,172,433	572,873	1,558,816	12,304,122	62.3
British Overseas Airways Corporation	1946–7	22,860,240	275,568,895	73.7	129,335	1,554.5	2,182.2	26,438,278	5,995,586	5,630,580	38,064,444	64.0
	1947–8	24,457,607	296,908,288	66.6	101,170	1,692.3	2,087.4	28,150,034	7,186,924	7,017,676	42,354,634	66.3
British South American Airways	1946–7	2,776,679	31,495,829	65.7	6,937	127.6	202.4	2,966,811	782,666	1,114,582	4,864,059	58.0
	1947–8	4,795,786	50,048,507	54.4	13,772	170.1	553.4	4,714,387	967,689	3,122,764	8,804,840	58.9
Total Internal Services†	1946–7‡	5,496,183	29,172,948	—	224,334	525.9	809.0	2,255,245	63,277	114,401	2,432,923	59.9
	1947–8	7,046,449	49,370,589	63.5	360,131	791.6	988.3	3,852,162	103,716	147,500	4,103,378	53.7
	Per cent Change	+ 28.2	+ 69.2		+ 60.5	+ 50.5	+ 22.2	+ 70.8	+ 63.9	+ 28.9	+ 68.7	
Total International Services	1946–7	28,310,017	335,496,591	72.7	194,847	2,094.4	3,108.9	31,977,139	7,081,141	7,210,692	46,268,972	63.5
	1947–8	34,672,378	420,061,443	66.0	266,333	2,461.7	4,675.2	39,184,692	8,623,770	11,551,756	59,360,218	65.3
	Per cent Change	+ 22.5	+ 25.2		+ 36.7	+ 17.5	+ 50.4	+ 22.5	+ 21.8	+ 60.2	+ 28.3	
Total All Services	1946–7‡	33,806,200	364,669,539	—	419,181	2,620.3	3,917.9	34,232,384	7,144,418	7,325,093	48,701,895	63.3
	1947–8	41,718,827	469,432,032	65.7	626,464	3,253.3	5,663.5	43,036,854	8,727,486	11,699,256	63,463,596	64.4
	Per cent Change	+ 23.4	+ 28.7		+ 49.4	+ 24.2	+ 44.6	+ 25.7	+ 22.2	+ 59.7	+ 30.3	

* Includes excess baggage and diplomatic mail.
† Excludes U.K./Continent services operated by B.E.A. English and Scottish Divisions (included in International Services).
‡ Includes operations of Independent companies before incorporation in B.E.A.

Civil Aviation News . . . . .

BREVITIES

THE introduction of the new B.O.A.C. London-Rome-Cairo service on February 12th, to be operated three times a week, brings the total number of flights by B.E.A. and B.O.A.C. between London and Rome to 25 a week.

* * *

Trans-World Airlines, the American airline, has carried 182,000 passengers on transatlantic flights during the last three years, and at present operates 52 flights a week compared with two a week in 1945.

* * *

During 1948 Air-India International, Ltd., operated their services with 100 per cent regularity, flying 4,681,910 miles and carrying 120,733 passengers. More than 300 tons of mail and 1,300 tons of freight were carried. In 1932, the first year of its operation, the airline flew 28,600 miles and carried no passengers.

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According to the Parliamentary Secretary to the M.C.A., no complaints have been forwarded to the Ministry from the Air Transport Advisory Council or from any other official body, regarding delays on B.S.A.A. services. He understood, however, that B.S.A.A. had themselves received several complaints which had been investigated, but these complaints had referred to delays caused by equipment and not by operations or maintenance.

* * *

As part of the general reorganization in the Canadian Pacific Air Lines, two new appointments have been announced. Mr. R. W. Ryan, general manager at Winnipeg, has become executive assistant to the president in Montreal, and Mr. G. Townley has become general manager of operations in Winnipeg. In announcing these appointments, Mr. Grant W. J. McConachie, the president of the Canadian Pacific Air Line, stated that the reorganization had been necessitated by the plan to extend trans-Pacific operations over 15,800 miles of routes to Australia, New Zealand and the Orient; existing domestic services cover 9,770 route miles.

* * *

Discussions recently took place in Dublin between the Chairman of the Birmingham Corporation Airport Committee with the Deputy Town Clerk of Birmingham, and Aer Lingus regarding the possibility of the airline operating a direct air service between the two centres. The matter will be referred to the Board of the airline and authorities in both countries, and it is expected that discussions will shortly be resumed.

* * *

Winter schedules operated by subsidiaries of Pan American World Airways have resulted in an 11 per cent decrease in the passenger miles flown during the last quarter of 1948 compared with the previous quarter. During this period 293,570,000 passenger miles were flown, a decrease of about 37,000,000 pass. miles. In the last quarter of 1947 the companies flew 294,612,000 passenger miles and 16,079,184 aircraft miles compared with 16,667,380 aircraft miles flown in the corresponding period of 1948.

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From April 29th to May 30th Swissair will resume an air service to the U.S.A. on a once-weekly schedule. After May 30th the schedule will be increased to two flights a week. The weekly service will start every Friday from Switzerland and every Sunday from Idlewild. The twice-weekly flights will be made on Mondays and Fridays from Switzerland and Wednesdays and Sundays from New York.

FROM THE CLUBS

MEMBERS of the Lancashire Aero Club are reminded in the February issue of *The Elevator*, the official organ of the Club, that the closing date for the Crossley Trophy competition is approaching and members are urged to compete for this Trophy up till March 31st. At a committee meeting on January 11th the Publicity Committee was re-formed and now consists of Mr. P. R. Jefferies, chairman, Mrs. I. Stockfis, Mrs. P. D. Jefferies, Mr. G. T. Wilby and Mr. R. B. Stockfis. Due to the fact that Mr. A. A. Orsi, the last holder of the Pemberton Trophy, has gone to South America, it has been decided to run a competition for the Pemberton Trophy on February 19th. Any member who has less than 50 hours solo flying experience can enter for this competition which is based on marks given for correctness of approach, landing and distance from the tape achieved in landings and forced landings. It is hoped that at least 20 competitors will enter.

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COMPARATIVELY few flying hours were completed at the Yorkshire Aeroplane Club during January but, as is usual at this time of year, the hangar staff under the Chief Engineer, Mr. Manning, is extremely busy doing overhauls for C. of A. renewals and generally preparing aircraft for the forthcoming season. Many members have already made plans for visits to the Continent during the summer, particularly to the rallies at Deauville, La Baule and Madrid. The Spanish rally has proved so popular that all the invitations were taken up within the first few days after the official announcement, but the Royal Aero Club have notified the Yorkshire club that a further allocation of invitations has been requested so that members on the waiting list may not be disappointed. Many members enjoyed an excellent film show on January 23rd arranged, produced, directed and presented by Mr. H. Pounder. On January 30th the excellent weather brought approximately 30 flying visitors to the club, 20 or whom came from the Brough Flying Club. Members will be pleased to learn that following a recent inspection, the Ministry of Civil Aviation commented on the excellent layout and facilities of the Yorkshire club at Sherburn-in-Elmet airfield. Six new members were elected in January.

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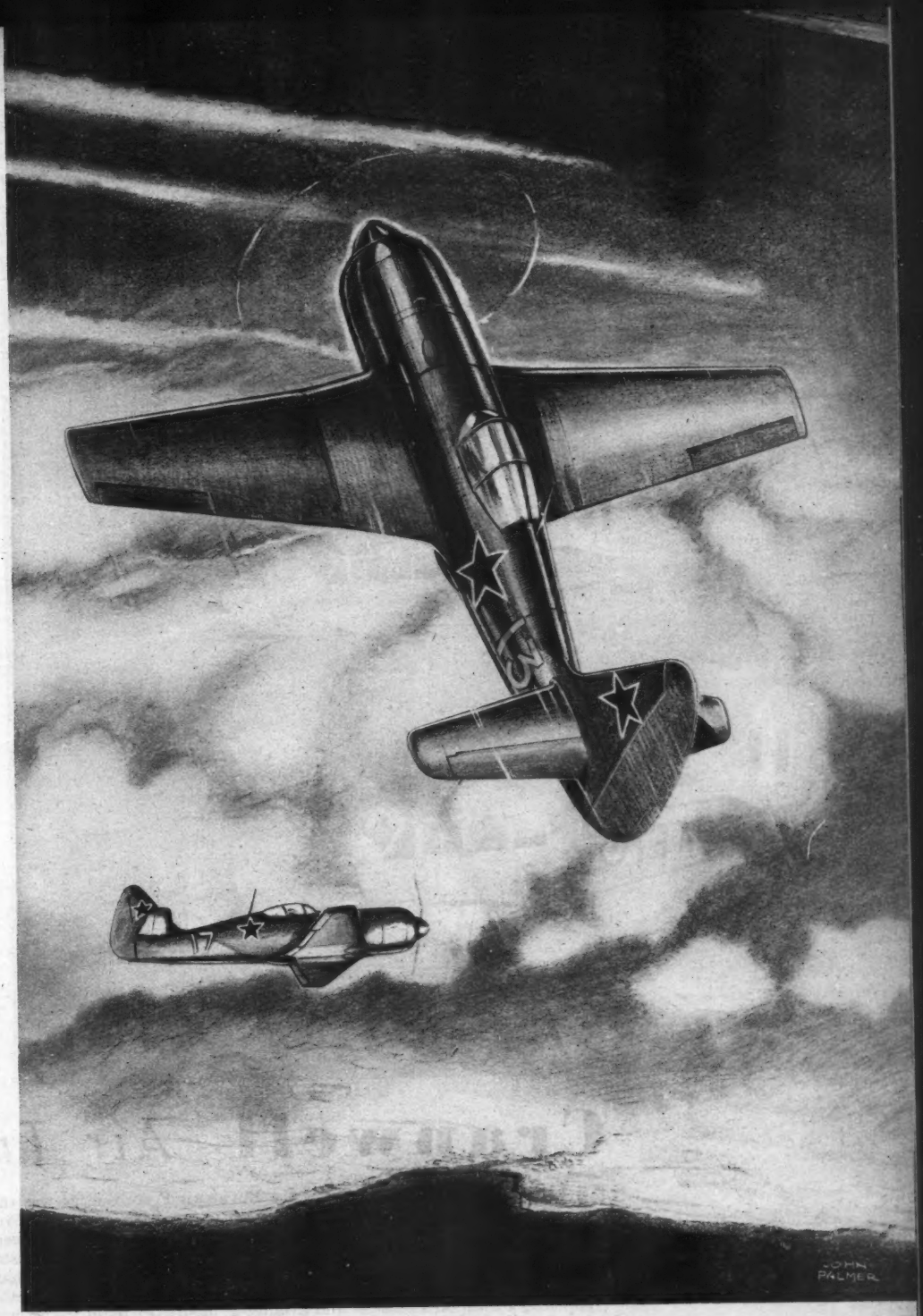
PLENTY OF ROOM UP TOP: One of the London Transport Flying Club fleet of three Tiger Moths photographed over Surrey. The Club has 100 flying members who are able to learn to fly for a cost of 5/- per 20-minute lesson. The premises at Fairoaks are open every day except Fridays and the only salaried official is the chief flying instructor, Mr. H. E. Baker.

AT a meeting of the Orkney Flying Club on Monday, February 1st, Mr. Moare and Mr. Tiffin, both of Stromness, were elected to the Committee. On February 7th a meeting of the Flying Training Sub-Committee was held, and on February 14th a full Committee meeting was held at the Kirkwall Hotel to consider the reports of sub-committees and to prepare the club rules. The flying training programme will commence in April and a dinner-dance is being held to mark its opening. Assistance on the question of initiating gliding activities at the club has been offered by the Scottish Gliding Union, and it is probable that two or three members will travel to Kinross to qualify in gliding so that preliminary gliding training may be given to enthusiasts of the club, one of whose members, Mr. Sydney Bichan, already has a glider in Orkney.

In connection with the proposed County of Orkney A.T.C. Unit, two Staff Officers, W/C. W. C. Ollason, D.S.O., D.F.C., Senior Staff Officer in charge of Administration at No. 66 (Scottish Reserve) Group, and W/C. S. R. Leitch, M.B.E., Officer in charge of the A.T.C. Branch at No. 66 Group Headquarters, will visit Orkney on February 21st. Further Committee meetings are to be held in Kirkwall and Stromness to consider the inauguration of the A.T.C. Unit and its training programme.



La-9

BELIEVED to be the most detailed and accurate representation of the type yet published, this *Flight* copyright drawing of the Russian La-9 fighter is based on recent photographs from Russia. A compact, post-war design, the La-9 equips many fighting and ground attack Squadrons. Though its two-row radial engine may develop over 2,000 h.p.—in which case the top speed should be appreciably in excess of 400 m.p.h.—this latest Russian piston-engined fighter is certainly inferior to the Hawker Fury in fighting effectiveness. Following a vogue set by the German Fw 190 and followed by the Fury, the exhaust stubs are concentrated at the sides of the cowling, in the upper section of which are synchronized guns. The oil cooler is mounted beneath the fuselage. To house the retracted wheels, the centre-section is of deeper chord than the outer mainplanes—one individual characteristic which aids in recognizing the La-9. It will further be gathered that the cockpit enclosure conforms more closely with British and American practice than the canopies of the earlier Yak and La fighters.

Flying instructors of the Royal Air Force College pose six of their new Prentices in commendable echelon.

Cranwell *Air Training*

THE Flying Training School of the Royal Air Force College was the first unit to receive a full complement of thirty Percival Prentice basic trainers. Prentices were first flown from Cranwell on August 10th last year, and instruction commenced just over a month later, on September 15th. Now three entries of cadets are being instructed on this new all-weather trainer which replaces the old Tiger Moth. No. 49 Entry have done on an average 20 hours per cadet in the half-term since transferring from Tiger Moths. No. 50 Entry have completed a term on Prentices and average 47 hours per pupil. The latest Entry, No. 51, have just commenced flying instruction and are approaching solo standard with an average of 5½ hours dual. Some 2,100 hours of Prentice flying have been completed to date.

It seems that the rather more complicated cockpit and drills take some time to understand, but that hours to first solo are about the same as on earlier elementary types. Landing and take-off instruction has been grasped quickly by pupils. The change-over to Harvards is also made more easily by Prentice pupils.

Serviceability of the Prentices has been good except for some tail wheel and sternpost weakness, brought to light by the particular type of airfield surface at Cranwell, after acceptance and service trials elsewhere. A small modification, rapidly effected, has eliminated the trouble which, it is understood, was traced to rebound of the tail wheel. Hours have been kept up in spite of the temporary unserviceability because Prentices can be operated in weather which would be quite unsuitable for instruction in Tiger Moths.

The warm, comfortable cockpit of the Prentice in which ordinary clothing is worn and movement is unrestricted, is much appreciated by pupils and instructors, as also is the excellent

field of view from both seats. The third seat is not at present used, and its usefulness for certain exercises is in any case reduced by the inability of the pupil at the rear to see the instruments or controls in front. Aerobatics and spinning may not be attempted with the third seat occupied, and for the time being pupils are not permitted to practice spinning solo.

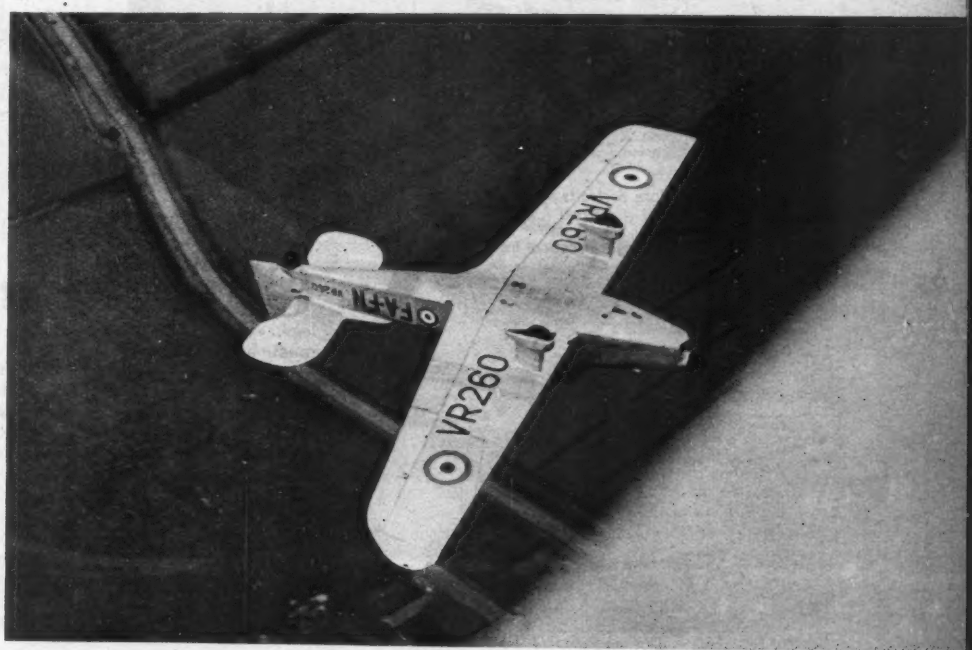
There are three Prentice flights, three Harvard flights and one Anson flight in operation at Cranwell at the present time. The all-weather training policy has been put into effect, but the all-through scheme whereby pupil and instructor go through the entire six terms together is not, as yet, in operation.

Cranwell has its own beam and both Prentices and Harvards make use of it. Prentices, of course, carry a full blind-flying panel and V.H.F. and T.B.A. (Tuneable Beam) equipment. Applied flying instruction can, therefore, be commenced at an early stage.

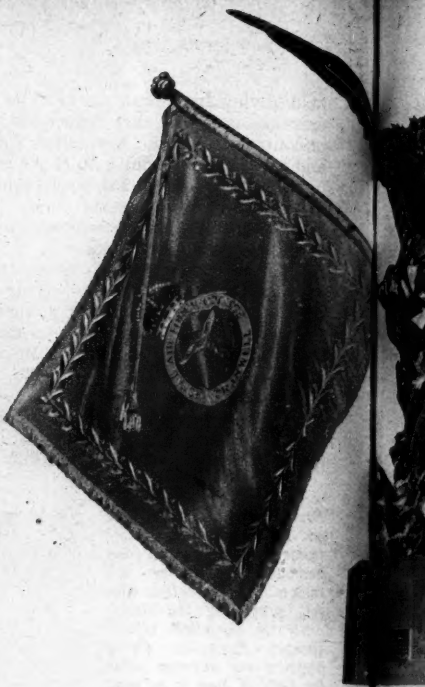
Some of the good qualities mentioned above account for the praise accorded the Prentice as a trainer for night flying. In particular the good view and docility on take-off and landing may be mentioned in this respect. A short account of experience of night " circuits and bumps " was published last week.

The accompanying pictures, recently secured by *Flight's* photographer, bear witness to the skill of Cranwell instructors. With the rather limited speed range of a basic trainer it is quite a feat to pose six aircraft in close formation beside a seventh photographic machine.

First photograph of a Prentice on its back. These basic trainers are, of course, fully aerobatic, but they are reluctant to do a true slow roll, preferring the slower slightly barrelled type. (Below) Formation flying presents no hazards when the field of view is as good as that from the Prentice.



College trophies displayed before portraits of the first Marshal of the Royal Air Force, Lord Trenchard (left) and A.V-M. C. A. H. Longcroft.



The King's Colour Royal

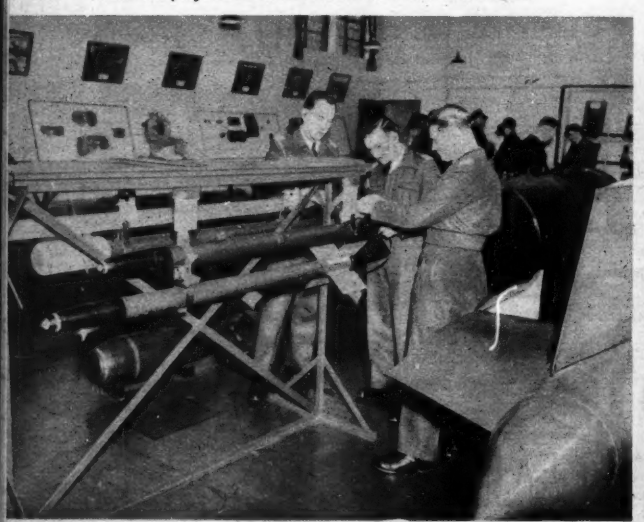
Cranwell Gro

Spitfires and a Master for practical instruction.

CADETS entering the Royal Air Force College at Cranwell must have attained Higher Schools Certificate standard and have satisfied a selection board as to their suitability. Such young men, who must also be between 17½ and 19 years of age, are drawn mainly from public and county schools, but some may also come from Halton, from the ranks of serving airmen or from among A.T.C. cadets with proficiency certificates.

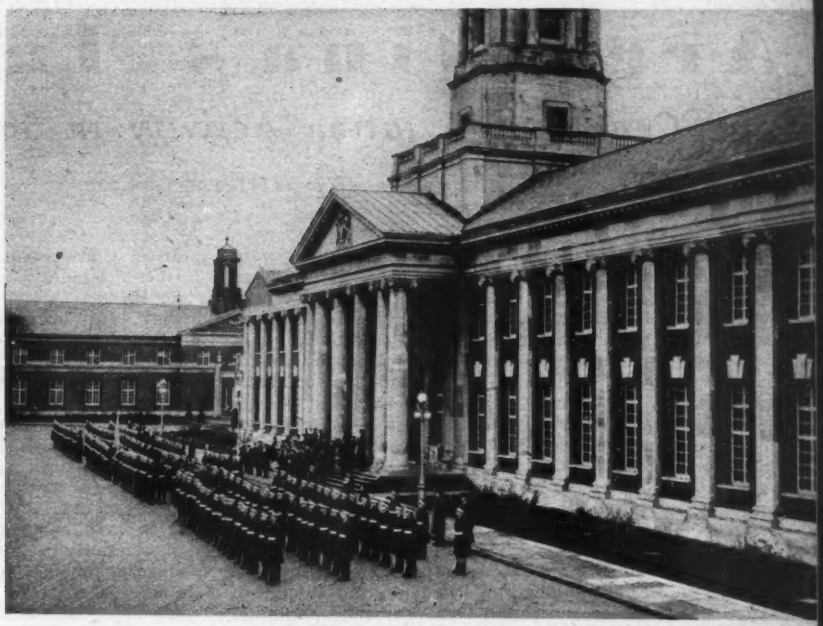
Their two years and eight months of training, prepares the cadets to take on not only the duties of a junior officer but also to become leaders with the highest possible qualifications in whose hands, later on, the R.A.F. may be placed with confidence. To this end general education is continued, and much specialized instruction and

Rocket projectiles and bombs in the armament section.



A cutaway Derwent serves to illustrate a point to a class in gas turbines.

's Colour, Royal Air Force College.



An early morning ceremonial parade in front of the College buildings.

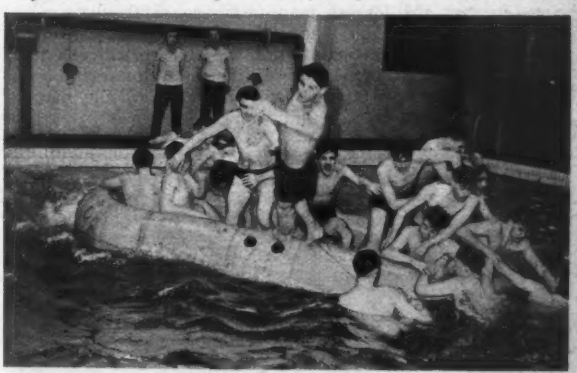
l Ground Training

training is added.

Last week a short summary of the cadets' work and training was published following a brief visit to the College. On these pages are depicted examples of ground training. It is concerned chiefly with aircraft, engines and armament. These subjects are taken by the more senior cadets, and although specific types of aircraft and engines used as examples are shown in certain illustrations, the instruction is directed towards knowledge of the underlying theory of all types. Junior entrants learn to handle tools, effect airframe repairs, and strip and assemble engines as part of their training.

During his first two terms, living under airman conditions, a cadet flies only as a passenger, but as he becomes more senior, flying instruction forms an increasingly important part of his training.

Physical fitness rates high on the priority list. All cadets swim.



A small wind tunnel for advanced aerodynamics instruction.

Instructional flights, by day or by night, are preceded by briefing.

Argentina's Industry

Centre of Aviation Activity in South America

By William Green

DURING the last decade, aviation has made very notable strides in South America and several modern air forces and independent aircraft industries have been developed. Argentina can now be considered as the leading light in South American aviation, and the substantial orders for Prentice trainers recently placed by Argentina have drawn attention to that country's aeronautical activities.

The Argentine Air Force, *Fuerza Aérea Argentina*, has, of late, acquired considerable quantities of modern equipment from abroad and can now be considered the strongest air arm in the southern half of the American Continent. Among recent purchases have been Meteor 4 and Fiat G.55 Centaura fighters, Lancaster and Lincoln bombers, and Bristol Type 170, Vickers Viking and de Havilland Dove transports. Deliveries are awaited of a further quantity of Meteors, substantial numbers of Prentices, and batches of Fiat G.46 and Ambrosini S.1001 Grifo trainers, in addition to the aircraft produced by Argentina's competent and growing aircraft industry.

The largest aircraft and aircraft engine factory in Argentina—in fact the largest manufacturing establishment in South America—is the Instituto Aerotécnico, of Cordoba, which employs over 6,000 workers. The plant was formerly known as the Fábrica Militar de Aviones and was established at Cordoba in 1926, primarily for the manufacture of foreign aircraft and aircraft engines.

I. Aé.-24 Calquin attack bomber.

I. Aé.-31 Colibri trainer.

Its first production, in 1928, was the Avro Gosport, and further machines were delivered shortly afterwards to the "El Palomar" Military Flying School. During the following year, licences were acquired for the construction of the Bristol Fighter F.2B (for the observation and reconnaissance squadrons), and the Dewoitine D-21 single-seat fighter monoplane. At that time, the Air Force was growing rapidly and the production capacity of the Cordoba factory likewise grew apace. In 1930 the first series of Dewoitine D-21s was on the production lines and the manufacture of engines was inaugurated with the construction of Lorraine-Dietrich of 450 h.p., for the D-21.

Between 1932 and 1937 a variety of nationally designed military and civil aircraft types was produced. Original design activity began with the Aé.C-1 three-seat, low-wing, cabin monoplane and the Aé.C-2 two-seat, low-wing, trainer. In 1933, the prototype Aé.T-1 was produced. This —the first commercial transport to be built in Argentina— was a seven-seat low-wing monoplane powered by a 450 h.p. Lorraine-Dietrich "W" water-cooled engine. Deliveries of this type were completed in 1934 and T-1s were employed for some years by the Aero-Argentina Airline which operated services between Cordoba and Buenos Aires. The Aé.M.E-1 and the Aé.C-3 two-seat tandem training monoplanes were produced in 1933 and 1934 respectively, and both types were manufactured in small quantities, the former for the military training units and the latter for the civil flying schools and clubs.

German Trainer and American Fighter

In 1937 the Aé.M.B-1 single-engined attack bomber was produced for Air Force bomber units, and some examples of this type were still in service in 1945. Production of foreign military aircraft under licence was resumed in 1938 and a year later a first series of sixty Focke-Wulf Fw 44J Stieglitz training biplanes was delivered. The 150 h.p. Siemens Sh 14A radial engines for the Stieglitz were also built at Cordoba. The Stieglitz was followed in 1940 by the Curtiss Hawk 75-O single-seat fighter monoplane, forerunner of the Curtiss P-36 (Mohawk) from which it differed primarily in having a fixed and spatted undercarriage. This was powered by a 840 h.p. Wright Cyclone and was Argentina's first all-metal aircraft. Considerable quantities of 75-Os were supplied to the fighter squadrons, and some are still in service as operational trainers.

On October 20th, 1943, the Fábrica Militar de Aviones came under the jurisdiction of the Secretaria de Aeronautica

I. Aé. D.L.-22.C trainer.

I. Aé.-27 Pulqui jet fighter.

and was renamed Instituto Aerotécnico. It was decided that the factory would concentrate on experimentation, development and production of nationally designed aircraft and engines. The first manifestation of this change of policy was seen in the I.Aé-21 all-metal advanced trainer for the Escuela de Aviacion Militar. However, owing to shortages of metals, the design team had to revert to national woods, the I.Aé-21 being discarded and the all-wood L.Aé.D.L-22 advanced trainer being developed, the prototype of which was flown for the first time in May, 1943. Some hundreds of these aircraft have been built, in two versions, powered alternatively by the home-designed El Gaucho radial, or the Armstrong Siddeley Cheetah 25. Both versions are in service and are used for advanced flying, gunnery and bombing training.

Outside Influence on Design

In 1944, the Institute designed and built a prototype of a troop-carrying glider known as the Mañque, based upon the Waco CG-4A, from which it differed in very few respects. It had accommodation for some fifteen troops or could carry a standard 75mm howitzer. Quantity production was not undertaken.

A derivative of the Stieglitz produced in 1945 was the I.Aé-23, an aerobatic training biplane powered by the Siemens Sh 14A radial. Constructed of national woods, it was produced in limited numbers for the military flying schools and clubs.

Argentina's first "twin" was the I.Aé-24 Calquin (Royal Eagle) twin-engined attack bomber, a design obviously inspired by the Mosquito. First flown in June, 1946, the Calquin was originally designed with the Rolls-Royce Merlin in view, but as that engine was not available in sufficient quantities, the initial production version, now in service in some numbers, has been powered by two 1,050 h.p. Pratt & Whitney R-1830-SC-G Twin Wasp radials which give a maximum speed of 292 m.p.h. In keeping with the Calquin's Mosquito-like appearance, construction is all wood. It has a crew of two and carries an internal bomb load of 1,650 pounds. Armament consists of four 20-mm Hispano 804 cannon in the nose, and launching rails for twelve rockets are mounted outboard of the engine nacelles.

Production of a 404-m.p.h. Merlin-powered version is planned for this year.

Despite comparative inexperience in the production of high-speed aircraft, the Institute has already entered the field of jet propulsion with an original design by M. Emilio Dewoitine for a single-seat fighter—the I.Aé-27 Pulqui (Arrow), which flew for the first time on August 9th, 1947.

A single Rolls-Royce Derwent 5 mounted in the fuselage gives a maximum speed of 528 m.p.h. Four 20-mm cannon are carried. The Pulqui has a span of 36ft 11in, and its length is 31ft 9½in. Reports indicate that flight trials with the prototype have not proved entirely successful, and it is doubtful whether the type will be placed in production.

The Institute's latest trainer is the I.Aé-31 Colibri (Humming Bird), first flown on September 15th, 1947, after progressing from initial drawings to flight trials within nine months. At present the Colibri is powered by a Cirrus Major III, although the Gipsy Major 10 will be installed in production aircraft. Tests with the prototype have proved very satisfactory and the Colibri will be produced in quantity for the flying clubs.

Most recent design to emerge from the Institute, the I.Aé-30 Namcu single-seat fighter, was designed by Ing. Pallavicino, and first flew last July. Having the appearance of a Hornet/Welkin hybrid, the Namcu is powered by two 2,035 h.p. Merlin 134/135 engines driving "handed" D.H. four-bladed airscrews. As in the Hornet, the coolant air intakes are in the leading-edge of an extended wing centre-section. Armament is heavy, consisting of six 20-mm cannon mounted in the underside of the nose, with provision for carrying one 550-lb bomb beneath the fuselage. Leading particulars are: Span, 49ft 2in; length, 37ft 9½in; height, 15ft. 11in; all-up weight, 19,380 lb. No details of the Namcu's performance have as yet been divulged, but it is estimated that maximum speed is approximately 430 m.p.h.

During 1939, the Institute (then the Military Factory) designed and built the prototype of a two-seat light cabin monoplane known as the El Boyero. A licence for its manufacture was granted to the S.A. Sfreddo y Paolini but, owing to the difficulty of acquiring the necessary equipment and materials at that time, production was shelved. Construction has now been taken over by the S.A. Establecimientos Aeronauticas Petrolini Hermanos of Moreno, who have received an order from the Government for 160 El Boyeros for the flying clubs.

Designed by Señor J. A. Peretti, the El Boyero is a two-seat high-wing fabric-covered monoplane of mixed wood and steel construction, following the Piper Cub *motif*. At present, a 65 h.p. Continental A-65 engine is installed but, alternatively, the 75 h.p. Continental C-75 can be fitted.

The Companhia Industria Metalurgica & Plastica S.A. of Buenos Aires entered the aircraft industry in 1941, with the Impa RR-11 two-seat cabin monoplane. Quantity production was not undertaken. This company's second design, the Impa Tu-Sa-O, appeared in April, 1943, and

(*Concluded on page* 203)

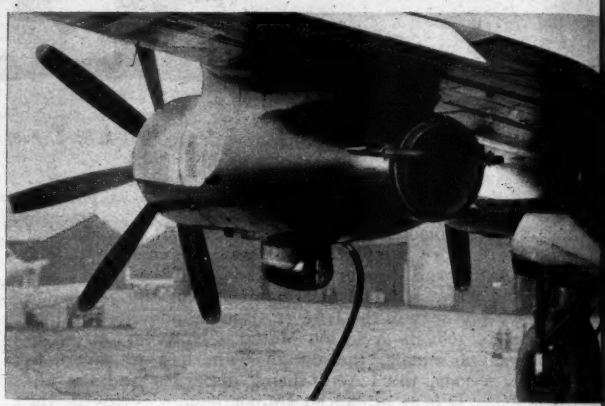
PYTHON LANC

ONE of the most important large power units to commence flight development in recent months is the Armstrong Siddeley Python turboprop. Two Pythons have been installed in place of the outboard Merlins in a Lancaster, and some dozen flights have been made to date. In the rear fuselage are automatic recorders, and in the navigator's position there is a large panel carrying instruments for the flight observer. Substantial rearrangement of the pilot's controls and instruments has also been necessary, in particular the original throttle quadrants have had to be extended. All Python controls and instruments are painted or ringed in yellow.

Each Python installation provides about two-and-a-half times the power of the original Merlin, and weight complete is about 2,000 lb more. For this reason, and because the Pythons need an oil supply, the original outboard fuel tanks have been replaced by small oil tanks. Of the remaining tanks, number ones inboard contain petrol and number twos paraffin. Additional paraffin tankage is provided in the bomb bay.

At the present stage S/L. Price-Owen is engaged on clearing the test bed as a flying machine according to modified Form 970 requirements. When this has been done engine tests and development can commence. Normal take-off, climb and landing, high-speed flight at 20,000ft, asymmetric flight and baulked landings are on the current agenda. So far take-off has been made with Pythons at Merlin equivalent power, and it is unlikely that full Python power will ever be used for take-off as safety speed would be as high as 200 m.p.h. Safety speed for an engine cut with the take-off power now used is about 130 m.p.h. Asymmetric limitations in flight are set by the strength of the fin and rudders, and of the pilot to operate the rudders. Limiting airframe speed will probably be around 325 m.p.h. Relighting tests with Pythons have to date been 100 per cent successful.

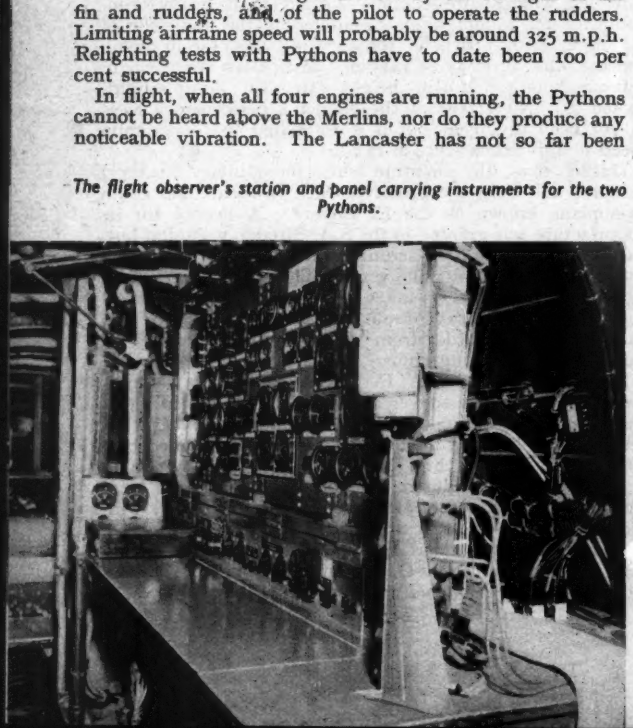
In flight, when all four engines are running, the Pythons cannot be heard above the Merlins, nor do they produce any noticeable vibration. The Lancaster has not so far been flown with Merlins feathered. Due, to a great extent, to the extra weight near the wing tips, aileron control has proved to be rather sluggish.



A rather foreshortened Python nacelle with oil cooler below.

Pitch and power control, as would be expected, has been very carefully studied. The basic fine-pitch stop for the Rotol contraprops has been fixed at 15 deg, while with the withdrawable stop engaged in flight is set at 25 deg. The power control quadrants of the Pythons are gated to operate conveniently with the Merlin throttles between them. There is a flight closed position lining up with that of the Merlins, and a Merlin equivalent full-power stop. In addition, there is a ground idling position with lever right back, and a high (in excess of Merlin) power section of the quadrant forward through the gate.

Later installations may have the intake annulus farther aft, as the present intake fairing and cowlings have to be removed to service the engine.



The flight observer's station and panel carrying instruments for the two Pythons.

The thrust line of the compact Python installation is 22 inches below that of the original Merlin.

THE COCOS ISLANDS

An Account of the Development of a Coral Atoll in the Indian Ocean

By WING COMMANDER D. MARTIN BUTCHER, O.B.E., *p.s.a.*, F.R.Met.S., A.R.Ae.S.

THE Cocos Islands, outpost in the Indian Ocean, came into the news at the end of the war against Japan. The history of these islands, and the story of their twentieth-century development, makes an interesting story of commercial and Service enterprise.

The earliest record in the history of the Keeling-Cocos group of islands occurs in the log of William Keeling, merchant and seaman, who discovered the islands in 1609. Thereafter, the atolls remained uninhabited—although visited on occasion by small parties—until 1825, when Clunies-Ross established a colony on the Cocos Atoll with labour imported from the countries of the Far East.

In establishing his trading station, Ross instituted what was probably the first social security scheme the world had ever known; all the inhabitants worked for Ross who, in return, guaranteed their food, shelter, clothing and necessities. Ross's title to the islands was confirmed by Queen Victoria, and later, as the colonial system developed, responsibility for the islands was vested in the Straits Settlements.

THE march of events may well be such that the strategic importance of the Keeling-Cocos Islands in the Indian Ocean will be renewed. This article recalls the circumstances in which the airstrip was built there during the war, when the Japanese campaign had broken communications between India and Australia. That the Islands may also prove important for civil operations was realized in Australia long ago, and last year a Qantas Lancastrian made a survey flight of a new route from Australia to Johannesburg via the Cocos Islands, Mauritius and Reunion.

In the spring of 1942 the tide of Japanese invasion had engulfed the Straits Settlements and, as Japanese ships and aircraft ranged the Indian Ocean, responsibility for the islands was transferred to the Government of Ceylon. For reasons that may never be known, the Japanese did not land on the Cocos Islands although they made some air attacks, during one of which, in the autumn of 1944, the ruling Clunies-Ross died.

The Japanese campaign had effectively broken communications between India and Australia, and the long-range Catalina aircraft which flew infrequently between Ceylon and Australia provided an inadequate means of transportation, the distance being so great that only a small payload could be carried on each flight. In the spring of 1944 attention was turning from Europe to the Far Eastern theatre, and the campaign there was to have been reinforced by the move of Bomber Command, under the code name "Tiger Force," to the other side of the world. Without a refuelling base between Ceylon and Australia, such re-deployment would have been impossible.

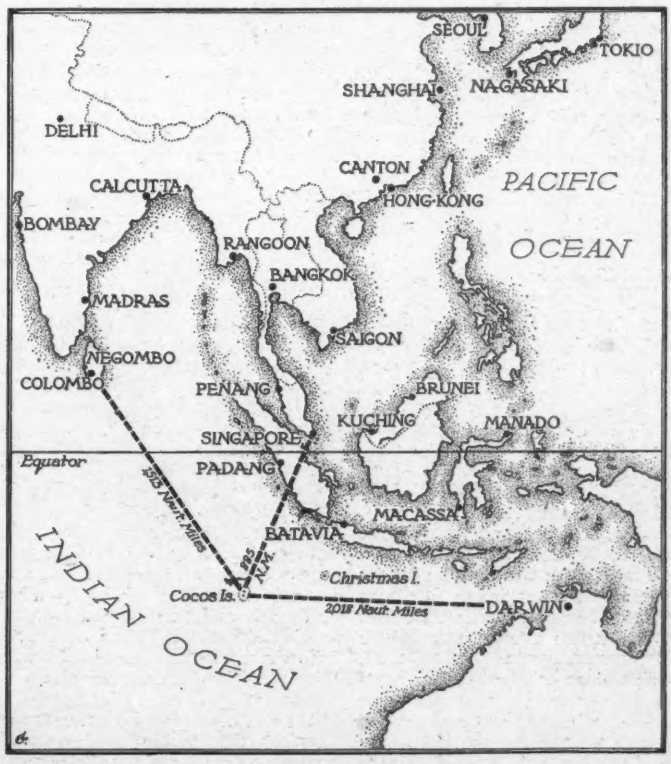
In 1944 a large airfield was under construction at Negombo, Ceylon, and, more than 3,000 miles across the Indian Ocean, airfields were under development in Australia. The choice of a staging airfield between the two places was necessarily limited. Christmas Island was too small and mountainous to allow the construction of a large airfield, and after secret reconnaissance, the west coasts of Java and Sumatra were found to be unsuitable. There was only one possible site—the Cocos Islands—and this view was accepted by the commanders.

Towards the end of 1944 the policy for the development of the Cocos Islands was to provide an airfield capable of handling 500 aircraft per month, to be in full operation by June 1st, 1945. The operation was to be under the command of an R.A.F. officer who would command and administer all services, and who would be responsible for the requirements being met on time. To prepare the plan, a small number of R.A.F. officers were drawn from units in the U.K. and flown to Colombo, Ceylon, where they arrived on December 7th, 1944, and established their planning headquarters at St. Giles' Convent.

Conferences between the R.A.F. and Army (from Ceylon Army Command Headquarters) planning staffs made it clear that about 8,000 men would be involved in the operation, including a Spitfire squadron for the air defence of the islands, a battalion of Punjabis for ground defence, heavy and light anti-aircraft units and, of course, engineering and ancillary units for the actual construction of the airfield.

Owing to an acute shortage of allied warships, it was agreed that the ships carrying this force would sail unescorted, and that the garrison would be unprotected until the Spitfires took the air. Since this involved building an airstrip and assembling the aircraft, the utmost secrecy was essential if the force was to escape attack from the nearby Japanese before the defences of the island were working.

It was originally in-



A "Flight" copyright map showing the importance of the Cocos Islands in relation to air strategy over the Indian Ocean.

The Cocos Islands . .

(Shell Aviation News photograph.)

The control tower on West Island airstrip.

tended that two runways should be constructed, but this conception was later modified by experience, and only one strip was built, facing about 15 degrees out of the prevailing south - east trade winds, which in that region blow during most of the year.

The bulk of the R.A.F. personnel were provided from the U.K., and on arrival in India were quartered at a disused airfield near Bombay, where the men were acclimatized and given defence training. The Spitfire squadron and most of the Army units were drawn from those already in the theatre, and their training and acclimatization had already taken place as a result of experience.

The stores and equipment required for the operation were drawn as far as possible from within South-East Asia, but certain specialist equipment and, in particular, spares pack-ups for Lancasters, were obtained from the U.K. All these stores were concentrated in and around Bombay, the port from which the operation was to be mounted. Subsequent maintenance of the islands, after the initial build-up, was to have been from Madras.

There were many minor changes during the planning stage, and many difficulties to be overcome. As a result of a change in policy at home, the number of aircraft to be staged through Cocos was reduced to 300 per month, but this reduction made little difference to the planning, as the bulk of the men and supplies was required to build the airfield and installations, which remained a constant requirement whether 500 or 300 aircraft were to use the place.

After a change in dates to avoid clashing with a proposed operation against Rangoon, the first ships sailed from Bombay and arrived in the Cocos Atoll on March 20th, 1945. Heavy seas were running, and small parties were put ashore in the ships' boats, as it was found impossible to launch the landing craft. Two days elapsed before the work of unloading could commence, and the main personnel ships did not arrive until April 3rd.

A 2,500-yard Runway

The airstrip had been sited on the broadest part of West Island, the largest island of the group. As the jungle was cleared from the site it was found that the topsoil varied in depth between about 4 and 25ft. In view of the large amount of earth which would have had to be shifted, it was decided to concentrate all machinery on to one strip, which was slightly re-sited during construction to give a clear run of more than 2,500 yards. During clearing operations, the bull-dozers felled some tens of thousands of coco-nut trees which had been the main source of income for the inhabitants of the islands; compensation was later paid to the Clunies-Ross estate for the loss of income occasioned by the construction of the strip.

As the stores ships unloaded, it was found that a large amount of equipment had been pilfered in transit. Packing cases arrived with little more than the packing inside, the contents having been removed by dockers and others who were skilled at such thefts. In some cases the losses due to theft had serious consequences, consequences which would have been vital had Japanese opposition developed.

In spite of setbacks, some serious others merely irritating, good progress was made on the construction of the airstrip. Work was started a few days after the arrival of the main personnel ships, i.e., about April 7th, 1945. By April 20th the jungle had been cleared to a distance of 1,200 yards, and 800 yards of P.S.P. runway had been laid. It was on April 20th that the first Spitfire landed in crates over the beaches, transported over seven miles of jungle track, and assembled under the coco-nut trees—took the air. The island was no longer defenceless.

On May 28th, 1945—about 50 days after work commenced—2,500 yards of jungle had been cleared and P.S.P. laid to 2,000 yards. On this day the first heavy bomber landed on the strip, which was by then fully equipped with flying control, radio and radar aids and all the ancillaries required of a modern airfield.

By the middle of 1945 the Cocos Islands were becoming a vast base, with fuel storage tanks, a light railway, servicing facilities and large storage dumps. As the work progressed the Air Ministry directive again changed. Originally the base had been planned to handle 500—later reduced to 300—aircraft per month, staging between Ceylon and Australia. A further reduction was made to 200 aircraft per month, and the base was called upon to fulfil an operational commitment.

The war in the Far East was progressing favourably. Australians were making progress in Borneo, and Cocos based Mosquitoes were making regular photographic reconnaissance flights to the East Indies. In the north, operations in Burma were meeting with success, and attention turned to an attack on Singapore. The Cocos Islands were to have been used for the air side of this operation.

Fortress Headquarters was accordingly notified that the following operational units would be based on the Islands:

Four Heavy Bomber squadrons.
One Long-Range Reconnaissance squadron.
One P.R.U. Flight.
One Flying-Boat squadron.
One Air/Sea Rescue unit of aircraft and surface craft.

These air forces were additional to the Spitfire defence squadron, and the marine units were in addition to the "Q" ships which were operating under Force 136 (who had an advanced base on Cocos) in and around the Java Sea. The Cocos Islands were assuming a major strategic importance in the Far East.

The new squadrons started to arrive on the Islands in July, 1945, and sorties were made against shipping in the Java Sea. The build-up of bombs and ammunition was proceeding, and everything was prepared for large-scale operations when the Japanese surrendered.

This work on the Cocos Islands was not entirely wasted, although millions of pounds were expended on a project which had never before been attempted by the British—the construction of an airfield on a remote island in short time. A few aircraft were staged—through to Australia, although the numbers did not approach those for which the base had been planned. Small operations were carried out against the enemy, and valuable photographic reconnaissance was made of Malaya and the East Indies. Supplies were dropped to agents throughout the Far East,

who were becoming hard pressed owing to the almost complete lack of airborne supplies since the retreat in Burma.

Main operations came after the close of the war, when aircraft flew into the East Indies and evacuated allied prisoners of war (R.A.P.W.I.) from the camps.

The latter part of 1945, and 1946, was spent in undoing much of the work which had been done. The main installations were left in place, but much valuable and technical equipment was dismantled and shipped to the mainland. Stores and transport which could not be removed from the island were dumped in the sea and, about one year after the first landing on Cocos, the Islands became once more an unimportant coral atoll in the Indian Ocean. John Clunies-Ross—next in the line of rulers—was reported to be studying in England as a preliminary to resuming his rule.

It was gratifying to all concerned in the operation to receive the following message from the Allied Air Commander-in-Chief, South-East Asia (Sir Keith Park): "You and your team have created the best organized base I have seen in any overseas theatre in this war."

LORD LONDONDERRY

THE death of the Marquess of Londonderry on February 11th at Mount Stewart, in Northern Ireland, did not come as a surprise, since he had been ill for a very long time. In fact, he had never really recovered from the injury he received in a glider accident some years ago.

Lord Londonderry leaves many friends, and his generosity towards the Guild of Air Pilots and Air Navigators, of which he was Master, was invaluable to that body. In a tribute to Lord Londonderry, the Guild states: "The Guild loses a Master whose work epitomizes his services to aviation. We mourn the passing of a rare character, combining the old morality with a progressive spirit."

First connection of Lord Londonderry with aviation came in 1920, when he became Under Secretary of State for Air under the Coalition Government in which Mr. Churchill combined the portfolios for War and Air. He did not remain long in that post, but in 1931 he returned as Air Minister, and remained in office until 1935, when Ramsay MacDonald was succeeded by Stanley Baldwin, and Lord Londonderry by Sir Philip Cunliffe-Lister (now Lord Swinton).

During his term of office Lord Londonderry fought hard for aviation, but the Cabinet was not sympathetic, and his efforts were largely unrewarded. Lord Londonderry made many inspection flights to different parts of the Empire, and although he was no longer a young man, he decided to become a pilot. His tutor was Capt. Baker, of Heston.

In more recent years Lord Londonderry did good work by his speeches in the House of Lords, where his calm judgment always received an attentive hearing. Before the Second World War he did his utmost to make Germany see reason. As a result, he was greatly misunderstood and unjustly accused of being pro-Nazi.

With the death of Lord Londonderry British aviation has lost a great champion, and his innumerable friends a great gentleman of the old school, a school which is by now almost extinct.

The late Marquess of Londonderry.

SECOND BLERIOT LECTURE

French Practical Aerodynamic Methods Explained

THE first lecture commemorating the famous French pilot and aircraft constructor, Louis Bleriot (the first man to fly across the Channel), was delivered by Air Commodore F. R. Banks in Paris last year. The second paper had been prepared by two French engineers, M. Jean Brocard and M. Francois Hussenot, and was read before the Royal Aeronautical Society on February 10th.

If the paper did not reveal any startlingly new methods in aerodynamic research and testing, it did show that in spite of difficulties which must often have been almost intolerable, French experimenters have managed to carry on, not, of course, on a very large scale, but in a highly creditable manner. Where there is a will there is usually a way, and our French friends have certainly managed to obtain good results with relatively modest testing and experimental equipment.

French experimenters have paid much attention to slipstream effect and the use of powered wind-tunnel models, using electric motors. An interesting test was on wing-mounted airscrews turning in opposite directions. It was found that when the airscrews turn "inwards" the tailplane was almost completely immersed in the tip vortex sheet. When they turned "outwards" the vortices were to some extent clear of the tailplane, and the stability gradient was substantially increased. These results were confirmed by flight tests on a Breguet 460. Comparative tests were also made on models of various sizes and of the full-scale Breguet 730 flying-boat.

A very simple method for ascertaining aileron effectiveness was tried on a glider. At each wing tip was mounted a water-ballast tank. The glider was towed to height with both tanks full. After being cast off and on a steady course, the pilot released the water from one tank, thus applying a known rolling moment. This was countered by appropriate aileron and rudder deflection (the latter to counter the induced yaw) and the Hussenot-Beaudoin recorder noted control column and rudder bar positions.

Another interesting flight-testing method has been developed by the Centre d'Essais en Vol de Bretigny, which corresponds somewhat to our Boscombe Down. Special automatic recording gear, using photographic paper 3.5in wide, is installed in the aircraft, and a complete polar curve is established in gliding flight with airscrews feathered. First the pilot puts the machine into a dive at the lowest possible speed, with a collimator trained on the visible horizon. This represents a period of acceleration, and is followed by a period of deceleration, in which the pilot uses a second collimator setting, which gives slight tail-down attitude. The two polars are obtained in about three minutes. The main parameters recorded during these glides are: time, dynamic pressure, altitude, incidence, and direction of resultant acceleration. The three quantities which require extremely accurate measurement are the dynamic pressure, the incidence and the direction of the resultant acceleration. The two latter need errors to be kept down to a twentieth of a degree. The dynamic pressure accuracy is achieved by pressure intakes in the nose of the fuselage or in the leading edge of the wing. The angular measurements were made by means of a heavily damped pendular level indicator with multiple mirrors, which gave a deflection of 0.51in per degree.

ARGENTINA'S INDUSTRY

(*Concluded from page 199.*)

small numbers were delivered to the clubs. However, a number of serious defects appeared which proved impossible to remedy without a complete redesign. After a series of accidents, production ended and the machines in service were withdrawn. The company is at present undertaking experimental work with light aircraft and gliders.

The nationally designed 450 h.p. El Gaucho radial engine which appeared in 1943 has now been produced in substantial numbers in the engine shops of the Instituto Aerotécnico at Cordoba and is shortly to be followed on the production lines by the second engine of national design, the 620 h.p. El Indio radial. A new 500 h.p. radial is in the project stage and will be developed during 1949/50. The workshops have completed the tooling up for Derwent 5 production under a licence agreement with Rolls-Royce, and the first units will be delivered this year.

Future plans of the Institute include the construction of a prototype four-engined transport for both passengers and freight, work on which will begin this year, and series production is planned for 1951. Other constructional projects include a twin-engined ten-passenger transport and a modern basic trainer. As the Argentine Government holds a licence for building the Prentice, it is probable that this will be the type to be produced at the Cordoba factory.

AIR SURVEY EXHIBITION

Hunting Aerosurvey's Display in Famous Gallery

OFFICIATING as chairman at the opening of "The World From the Air" exhibition at the Alpine Club's gallery on February 8th, Lord Brabazon of Tara—the father of air mapping in this country—related some of his experiences at the beginning of the 1914-18 war when he, as 2nd Lt. (under probation) Moore-Brabazon, with Sgt. Laws, under the command of Col. Trenchard, attempted to persuade the Army chiefs of the usefulness of air photographs. He recalled that only after a number of rebuffs was their value recognized.

Lord Pakenham, who opened the exhibition, in continuation of Lord Brabazon's theme, pointed out that air mapping of the invasion areas was started on D-Day minus 2½ years and that the resulting plans were of a larger scale and much more detailed even than those made by the French. Another point made by the Minister was that air survey now lived by its own right and was no longer a by-product of any of the branches of cartography or aviation.

For an exhibition dealing with a subject having so many facets, the space available is very limited but Hunting Aerosurveys, who are the sponsors of the display, have managed to include examples of most of the important applications.

Down one side of the gallery examples of these applications cover the walls; forestry and agriculture, geographical education, geology, archæology, architecture, town planning, map revision and model making are all shown. On the opposite flank are examples of work done by Hunting Aerosurveys at home and in the Middle East, as well as specimens from other concerns of the Hunting Group in Africa, New Zealand, Australia and Canada.

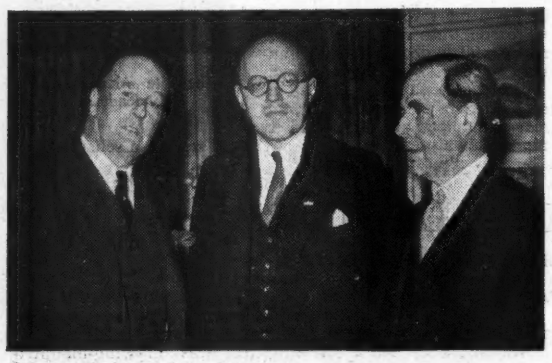
Displayed around the lower panels of the gallery are nearly 80 oblique photographs of superb quality, and quite outstanding in their æsthetic value are two air views of trees and villages peeping through low mist.

The floor is taken up by exhibits of equipment necessary for air survey work. Kodaks show special panchromatic and infra-red films, filters, Kodatrace sheeting and some air photographs in colour. Bristols have a model of their famous Freighter displayed with a number of photographs showing the aircraft adapted specially for air survey work.

The Williamson Manufacturing Co., Ltd., who designed and built the first British semi-automatic air camera ever to be made, have on show their latest O.S.C. Mk. 2 survey camera and Williamson-Ross Multiplex mapping equipment.

In graphic form Decca Navigator Co., Ltd., show their method of enabling air survey plotters to estimate the exact position in space occupied by the photographing aircraft at the time of making an exposure. Accuracy is claimed to be within 20-100 yards.

The exhibition, which is free, will continue until Feb. 19th and is open on weekdays from 10 a.m. to 7 p.m. Lectures, demonstrations and films are given each day at 3 p.m. and 5.30 p.m. The address of the Alpine Club's gallery is 74, South Audley Street, London, W.1.



AT THE OPENING: (Left to right) Lord Brabazon of Tara, who also celebrated his 65th birthday on the day the exhibition opened, Lord Pakenham and Lord Rennell of Rodd, the eminent geographer.

GEORGE JEWETT

HIS many friends in the aircraft industry will have been deeply sorry to learn of the death, after a short illness, of George Percival Jewett. He was less than forty years of age, and had before him his most valuable years as an aircraft engineer. After working for ten years as a designer with the de Havilland Aircraft Company, George Jewett had been successively chief power plant designer and aircraft development engineer with the Bristol Aeroplane Company. In 1943 he joined Mr. A. E. Hagg at Airspeed primarily as a development designer on the Ambassador, and he was engaged on this work at the time of his death.

VAMPIRE FUTURE

THE DE HAVILLAND AIRCRAFT COMPANY, LTD., have recently announced their views on the future which lies before the famous Vampire fighter.

Adopted by no fewer than eight governments, apart from its service with the Royal Air Force and Fleet Air Arm, the Vampire is undoubtedly the most extensively chosen fighter in the world to-day.

It would be logical to develop the design in such a way that the aircraft's qualities of short take-off, exceptional docility and manœuvrability, and controllability at high altitudes, are retained, while advance is made in performance, principally in climb, ceiling and speed. The key to these improvements lies, of course, in the direction of increased thrust and a better Mach number limitation. On the power side of the picture, the Vampire went into squadron service with a Goblin of 2,700 lb static thrust. This was advanced to 3,000 lb and then 3,300 lb, and recently the existence has been officially announced of a Goblin turbojet of even higher output, the Mk 4. It is also quite well known that, since May 8th, 1947, a Vampire has been undergoing flight development fitted with a Ghost engine of 5,000 lb thrust and, of course, the Ghost may well be expected to rise to higher ratings, just as the Goblin has done. It is pertinent to recall in this connection that the Ghost-Vampire holds the International Height Record, and has done much valuable development flying at a little under 60,000 ft.

In regard to Mach number limitations, and aerodynamic progress generally, the company's unremitting work with the D.H. 108 aircraft, which have been flying since May 15th, 1946, and have exceeded the speed of sound in the dive, cannot but accrue to the general advantage, not only of future types of Vampires, but also of the still more advanced de Havilland fighters of the later future.

BLACKBURN GENERAL AIRCRAFT FREIGHTER PLANS

IT seems that no final decision has yet been taken regarding the airfield to be used for the first flight of the Blackburn General Aircraft Freighter which has reached a fairly advanced stage of construction at Hanworth. The original intention was to make the first take-off from Hanworth itself, but this has wisely been vetoed by the Ministry of Supply, for although the aircraft would undoubtedly be capable of taking off from the limited space available, Hanworth airfield is surrounded by housing estates, and the Freighter's response to its power-assisted controls bound to be something of an unknown factor.

A report has circulated in Yorkshire that the units of the Freighter are to be taken by road to the Blackburn factory at Brough, there to be assembled and test flown for the first time. Although this is not confirmed at Hanworth it would seem to be a sensible proposal, for once the units are loaded the cost and trouble of conveying them 200 miles by road would be little more than carrying them the two or three miles to London Airport or the 70-odd miles to Southampton, two other alternatives which have been mentioned.

No. 43 Squadron Re-formed

Inspiring Ceremony at Tangmere : Rhodesian Units Linked

Air Marshal Sir William Elliot, C. in C. Fighter Command, hands the badge of No. 43 Squadron to S/L. D. L. Harvey who commands the revived unit.

"Flight" photograph.

AT 11.50 hours on Friday last, No. 266 (Rhodesia) Squadron R.A.F. ceased to exist, and No. 43 (Fighter) Squadron R.A.F. came once more into being and joined its old stablemate No. 1 Squadron at its pre-war home of Tangmere. No. 266 has not, however, been doomed to complete extinction for, fifteen minutes later, its crest was handed over to No. 245 (Northern Rhodesia) Squadron for safe keeping until such time as No. 266 is resurrected.

The ceremony of re-forming No. 43 by the re-numbering of No. 266 was performed by the C. in C. Fighter Command, Air Marshal Sir William Elliot, in the presence of Marshal of the Royal Air Force Lord Douglas of Kirtleside, who, as Major W. S. Douglas in 1916, was the first commanding officer of No. 43. With them on the platform was Lord Balfour of Inchrye (a flight commander of the squadron in the 1914-18 war), Air Marshal Sir Alan Lees (a founder member), Air Marshal Sir Leonard H. Slatter (a commanding officer), Air Chief Marshal Sir James Robb, C. in C. Air Forces, Western Europe, and Air Vice-Marshal S. F. Vincent, A.O.C. No. 11 Group. Representing Rhodesia was Sir John Waddington, Governor of N. Rhodesia, Mr. K. M. Goodenough, High Commissioner of S. Rhodesia, and Sir John R. Chancellor, a former Governor of S. Rhodesia and, incidentally, Sir William Elliot's father-in-law. Seated in a group by the saluting base were a large number of past members of No. 43, including Col. Le Roy du Vivier, a war-time C.O. of the squadron who had flown over from Brussels for the ceremony.

"Flight" photograph.

Marshal of the R.A.F. Lord Douglas inspects the guard of honour drawn up on the base of a hangar destroyed in the Battle of Britain.

The scene was set in a perfect English February day; brilliant sunshine with some haze, and just a few wispy clouds with occasional vapour trails showing as some high-flying aircraft pursued its swift passage. The Central Band was in attendance and played the general salute as Lord Douglas arrived.

Sir William Elliot, handing the badge of No. 43 to S/L. D. L. Harvey, did so with these words: "S/L. Harvey, in accordance with the wishes of the Air Council, No. 266 Squadron which you have hitherto commanded becomes from this moment No. 43 Squadron. In token of this I hereby give you the crest of No. 43 Squadron, and in doing so I solemnly command you to accept it as the symbol of the great fighting traditions of that squadron, and require you to preserve and cultivate those traditions; and, when the time comes, to instruct your successor to do likewise and his successors in turn also so to do."

To the C.O. of No. 245 Squadron, with which No. 266 Squadron will in future be linked, Sir William gave the badge of No. 266 and said: "S/L. Wootten, similarly I entrust to your safe keeping the crest of No. 266, your sister Rhodesian squadron, and likewise command you and your successors most jealously to guard and preserve the traditions of that squadron until such time as the Air Council may decide to restore it to its former independency."

Lord Douglas then spoke to No. 43 with much understanding—for all his rank he is still a fighter pilot at heart and knows that there is much more to re-forming a unit than just juggling with numbers. "Men," he said, "have a great affection for their unit number. This affection is one of the great builders of morale."

Sir John Waddington then presented No. 245 Squadron with a shield, of Rhodesian teak and copper, and the parade ended with a march-past.

The next event was a flying display by No. 43, and in this connection it is of interest to draw attention to one of our correspondents who, on page 208, is inclined to doubt the practicability of the dictum of Major Barrington-Kennett of the Air Battn. R.E. and R.F.C., who said that the R.F.C. must be as smart as the Guards and as handy as the Royal Navy. Had our correspondent been at Tangmere on Friday last he would have changed his mind. Imagine a perfect line of seven spotless Meteors, each with its new crest stencilled on the nose. The pilots all mounted together; in exact unison the ground crews fastened the pilots' harness, jumping down from the wings as one man. Fourteen Derwents started as near simul-

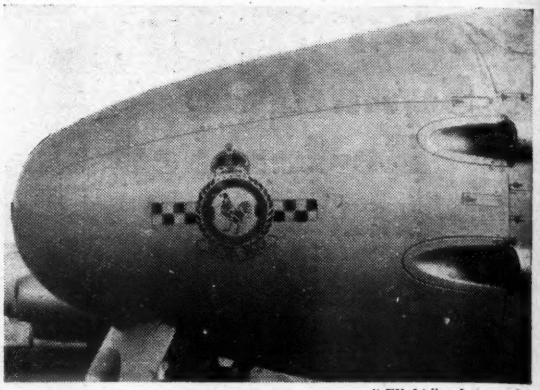
No. 43 Squadron Re-formed . . . . .

taneously as makes no odds, and the cockpit covers slid forward in precision, all closing as one. One Meteor remained as a reserve and the remainder took off as a three, a two and a single, in which F/L. Clayton put up an individual show. Despite a certain amount of mist which affected the visibility, the timing was perfect. Clayton would perform some evolution, leaving the airfield clear just as the formation of five arrived and, as they crossed the opposite perimeter, he would return to keep up the interest.

The formation-flying was perfect, and those who remember No. 43 in its heyday with Fury biplanes would agree that equal skill and precision are just as inherent in the squadron to-day. It is a great pity that all the Dismal Jimmies who kept telling us about what is wrong with the R.A.F. were not at Tangmere last Friday to see just a little bit of what is right with our great Service.

The Meteors having landed and been parked in the same parade-ground manner with which they took-off, a move was made to a nearby hangar where, with a bar and buffet lunch to help, old and new members of No. 43 and their guests refought old battles and talked of present problems.

Souvenirs on show of the Squadron included the original victory screen of the First World War and quite a number of enemy aircraft are shown on this to have been shot down by people whose names are familiar to us all to-day. Historic albums were there to recall memories and, on the wall, some photographs of the Squadron in the past. Among these were a number of *Flight* photographs showing the Squadron doing tied-together formation-flying on its Siskins in 1930, and of F/L. Philip Lucas, one of the earliest members of the Squadron when it was re-formed in 1925 after the 1914-18 war, rolling a Mark I Hurricane.



"*Flight*" photograph.

The new crest stencilled on the noses of No. 43's Meteors, combines the squadron badge and the pre-war squadron markings in black and white check.

No. 43 (Fighter) Squadron was formed at Stirling on April 15th, 1916, and went to France January 17th, 1917. It returned to England in December, 1918, and disbanded a year later.

Re-formed at Henlow on July 1st, 1925, it moved to Tangmere on December 12th, 1926, where it stayed until the outbreak of war in 1939.

In the Second World War the Squadron served in Scotland; over Dunkirk; in the Battle of Britain; in the N. African campaign; invasion of Sicily; Salerno; Italy and Southern France. It was disbanded in May, 1947.

Enemy aircraft claims in both wars total 269 destroyed, 30 probables and 127 damaged.

GLIDING CONFERENCE

DURING the week-end of January 29th-30th the British Gliding Association held a conference of chief instructors at the London Gliding Club, Dunstable. As reported in *Flight*, January 20th, the objects of the conference were to discuss improvement of the existing methods of solo training, by the interchange of experience and ideas amongst clubs, and by the raising of such standards as might be found necessary. Secondly, to gain information on two-seater instruction from those who had used this method. Under the general chairmanship of Mr. P. A. Wills, C.B.E., the conference was very well attended and the resolutions passed showed the clubs to be very alive to the problems with which they have to deal. They were also shown to be making a serious and successful attempt at efficient operation in spite of the lack of money forcing them in many cases to use unsuitable equipment. The final resolution passed was that the chief instructors' conference should become an annual event, to be held in the late winter so that information gained during the previous year should be available to all clubs before the next season's flying commenced.

Since no club has either the money or the space to run an International Meeting, the 1949 National Gliding Contests will present a problem to the B.G.A. The Derby Club is considering holding an informal meeting, but has suggested that the National Contests should be held on a points basis for the best flights made throughout the season, as was the case last year. Such an arrangement, however, would not, of course, provide the real practice for future international team members since pilots would not be flying in direct competition with each other under International Rules and Conditions. However, enthusiasts should be thankful to the Derby Club for offering to run an informal meeting where pilots can at least get together and fly.

LEARNING THE HARD WAY *(Continued from page 187)*

foam sets. Whilst the crumpled Avenger was being moved to the after lift, Lt. Baldwin arrived back with a new Sea Fury, but had to orbit for 18 minutes before being able to land-on, as there was some delay in clearing the lift.

After lunch, Lt. Cdr. Thomas took off again in the Avenger and made a perfect land-on, catching No. 1 wire. Four minutes later, at 1359, a Firefly 5 from 816 squadron, 20 C.A.G., came in for a landing. This aircraft, flown by Lt. D. Buchanan, R.A.N., with the Air Engineer Officer, 20 C.A.G., Lt. Cdr. (A) R. Manners-Clark in the back seat, had flown down from Eglinton, Northern Ireland, where the Group is now in training, dropped in at Lee-on-Solent for lunch, and then come out to visit *Sydney*. Lt. Buchanan made a very good initial approach, but, despite the batsman's very definite signals of being too low, spoilt it all by neatly flying slap into the round-down. It was a classic "collection." The ship was not pitching very much and rolling only slightly when the Firefly sliced off its undercarriage legs against the round-down, skated on its belly up the deck to smash into the first crash barrier and pull it out sufficiently to run on and slightly distend the second barrier. As the steel arrester wires were scraped against the steel deck plating, sparks flew out; frictional heat generated in the ruptured undercarriages caused the hydraulic fluid to smoke, but, fortunately, the Firefly's dihedral springing from the centre-line kept the wing drop tank clear of the deck and it did not burst.

This accident certainly gave the deck crews some real exercise and also afforded an excellent test of the crash barrier gear. Cranes, tractor trolleys and a fork lift truck were quickly brought into use but, despite the workmanlike handling, it was an hour and a quarter after the accident before the Firefly was lowered down the after lift.

When the accident occurred, Lt. P. C. S. Chiltern had been sitting in the second Avenger at the end of the catapult, ready and waiting to be shot into the air, and he said he felt decidedly uncomfortable looking out of the cockpit and seeing the Firefly slithering rapidly toward him. Despite the perfection of the day, it was not the sort of weather to go swimming and, in this connection, the pilot and passenger of the Firefly could be considered to be very lucky men indeed.

Flying was resumed with Chiltern's catapult take-off in the Avenger until, at shortly after half-past four, on his fourth landing, the position of the sun made it nearly impossible for him to see the batsman and he made a rather dicey landing with the Avenger engaging a wire, then climbing about 15ft into the air and descending with a tremendous bump. After this, the Avenger was put away and, from the flight control bridge, it was announced that flying was completed and so, at 1640, we altered course 180 deg and steamed home to Spithead.

C. B. B-W.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

THE R.E. BATTALION
Sappers Are Still At It

WE were naturally most interested in the article "Seventy Years Airborne" in your issue dated December 23rd, 1948.

It may interest you to know that the R.E. are still pioneering. The Mackinnon Road Flying Club was formed just six-months ago, largely due to that enthusiasm of Sapper officers who provided half of our original membership. We now have more than 60 members, 40 of whom fly, and we are logging over 100 hours a month.

Our membership is now 40 per cent R.E., but we are glad to include among us seven members who are ex-R.A.F., three of whom are now serving in the Army. I. S. KEELAN,
Kenya. Major, R.E., President.

JET PROPULSION
A Water Hose Analogy

MR. HOLLIS (20/1/49) should ask himself why a hose pipe fitted with a nozzle is difficult to hold when the water is turned on. The answer is given by Newton.

The speed of the water coming out of the nozzle is greater than that of the water in the hose. Newton's First Law stated that "Every body continues in its state of rest or of uniform motion in a straight line except in so far as it is compelled to change that state by impressed force." The uniform speed of the water in the hose pipe is increased through the nozzle by a force which is provided by the head of water behind the nozzle.

Newton's Third Law states "To every action there is an equal and opposite reaction." Thus, to the force acting on the mass of water to accelerate it through the nozzle of the hose pipe, there is an equal and opposite force acting backwards on the nozzle, trying to force it out of the hands of the operator.

The same principle applies to the jet engine. A mass of air and vapourized fuel is exploded, giving rise to a high pressure. This provides the force to accelerate the mass of burnt gases out of the jet (or nozzle). To this force there is an equal and opposite force acting on the casing forming the combustion chamber and exhaust jet, which is utilized to drive the aircraft forward.

Hence the word "reaction" is fully descriptive of the process involved. JOHN P. MacLAREN.
London, S.W.19.

THE W.R.A.F.
Has its Value Been Overestimated

LORD HENDERSON, in recent Air Force debates in the House of Lords, stated that the cost of the Forces must not be more than the country as a whole can afford. Now Service conditions for the new W.R.A.F. have been promulgated.

Although this women's Service is to be entirely non-combatant, the estimated value of the services of a W.R.A.F. officer is to be two or three times that of a skilled and efficient regular serving airman. Comparisons of pension rates show that, after twenty years' service, a W.R.A.F. officer will draw a pension of approximately three times that awarded to an airman who has gained the maximum proficiency and progressive promotion during his twenty years' service.

The anomaly that the services of one W.R.A.F. officer is equivalent in monetary value to that of three technical Warrant Officers, with ten years' seniority in that rank, indicates once again that the authorities concerned are grossly underestimating the value of efficient technicians to the Service, and will, I fear, act as an added deterrent to regular Service recruitment.

If the objective is to build up an entirely Amazon air force for the future, then the tactics being employed are obviously correct, but in that case, where will the combatant members come from in the event of hostilities?

In conclusion, is this expenditure on non-combatant women's services compatible with Lord Henderson's statements in the House of Lords on November 24th, 1948?
Newcastle-on-Tyne. ALEX A. METCALF.

CLIPPED WINGS
German Help Must be Controlled by Allies

I READ with great interest Mr. F. W. Ashford's letter concerning war industry and manufacture of trousers (*Flight*, January 27th). I think his argument goes a bit too far (although he does not mention human reproduction as war industry).

Having worn both, I consider civilian trousers much more comfortable than military ones, and I am sure that driving one's own car is much more pleasant than driving an Army lorry. But very few people can afford their own aircraft, and the choice, therefore, lies between civil and military aviation only. What youth (and it is youth in Germany that matters mostly now) having to choose between carrying passengers to and fro at comparatively low speed on the one hand, and controlling supersonic fighters or long-range bombers on the other, will not choose the latter?

I agree with Mr. Ashford that Germany would be a valuable ally in case of need. But the purchase of that ally will be restoring warlike feeling and "Herrenfolk" nonsense to Germany. I cannot imagine how Germans could be persuaded to return to normal life in peace and keep the lesson of 1939-45 in their memory after giving their valuable assistance to Britain and U.S.A.

German help cannot be left to chance, and it cannot derive from gratitude—a feeling unknown in politics. It must be calculated, organized and strictly controlled by the Allies—or at least three-quarters of the Allies. J. SCHUTZ.
Shrewsbury, Salop.

DISCIPLINE IN THE R.A.F.
Parades and Drill a Necessity

IT has become the fashion to criticize the R.A.F. as a Service and to find fault with its organization. But could not the present discontent be partly attributable to the fact that some airmen are under very mistaken impressions of what Service life entails? A most disquieting factor is that a not inconsiderable number of personnel seem to have completely overlooked the fact that they are soldiers—of a very highly specialized Service admittedly, but soldiers just the same—and therefore under military law as adapted to the requirements of the Air Force. They are so obsessed by their technical qualifications that they consider themselves a privileged class. Thus there are many who resent drill, parades, fatigues and other essential though admittedly tedious turns of duty. They must realize that in a Service which is virtually 100 per cent technical, all must take their share of drudgery for the common good of all.

Periodical parades ensure the maintenance of a modicum of smartness and pride in "personal and unit" appearance, and give the Commanding Officer an opportunity of addressing every man of the unit from time to time. The short talks—"pep" or otherwise—have more moral value and far-reaching effect than reams of colourless Station Routine Orders. It is part of the personal contact that counts for so much, that helps to make the airman feel that he is a human being, although his individuality is, of necessity, merged to a certain extent into that of his unit; for he must remember that he is one of a team—that is why he is in uniform—and cannot do just as he likes without letting the side down.

The necessity for a certain amount of drill is, I remember, admirably set out in the introductory section of the R.A.F. drill manual, which does not require enlarging upon. Without drill the appearance of a unit very quickly degenerates into that of a ragged mob. Furthermore, in the absence of transport, a well-drilled body of men can be quickly and smartly marched from one place to another. In short, they become highly manœuvrable as a unit. The immediate reaction to a word of command smartens men up and makes them more alert for any duty they may be called upon to perform.

On the other hand, a not infrequent cause of genuine dissatisfaction appears to be due to the promotion of some airmen to the rank of N.C.O. mainly on the grounds of their technical ability, not sufficient consideration having been given to whether or not they have sufficient powers of organization and aptitude for command.

Finally, the various sections of a station or wing are some-

Correspondence . . . . . .

times apt to dissipate too much energy in battling against each other, rather than in co-ordinating their different functions to the benefit of the unit as a whole. There is far too often a "dire shortage of personnel" when some special duty arises. No section will release their men who are invariably "engaged on work of the utmost importance"—except when they are due for a "pass" or some other privilege! A greater understanding of each other's point of view, problems and difficulties between officers and N.C.O.s i/c of the different sections, would help materially in ensuring a smoother running of units generally.

The keyword to a successful Air Force is *esprit de corps*.

New Malden, Surrey. N. HEATON,
Ex-Adjutant, R.A.F.

GROUND CREWS OF THE R.A.F.
Something Better Than ACH/GD Adminstrators Needed

YOUR correspondent Mr. Alex Metcalf (*Flight*, January 27th) accuses me of bias against the R.A.F. May I state that as a youngster my greatest ambition in life was to enlist as a regular airman, but family duties effectually prevented this. My father was elderly, and I found myself involved in his business.

In January, 1939, free from earlier responsibilities, I endeavoured to join the Balloon Barrage side of the Auxiliary Air Force. But on the grounds that I was engaged in a reserved occupation they refused me. An appeal to the O.C. of an R.A.F. recruiting office, a friend of mine, availed nothing. (Correspondence to support this has been submitted to the editor of *Flight*.)

Finally I had to wait my call-up in August, 1941, before joining the R.A.F., and I still remember the proud feeling as I donned for the first time the uniform I had so long respected. Does this not suggest a bias in favour of the R.A.F.? That bias is still strong within me.

I realize that discipline is necessary, and smartness too, in a fighting Service. I cannot agree that despotic powers, in and of themselves, are the cause of the trouble. I have known officers and N.C.O.s who showed that they possessed leadership and who, in the right sense of the word, were gentlemen. They were efficient and maintained order without tyrannizing.

The retention of authoritative powers in the hands of the officers is essential to enable them to control the ever-present unruly minority in the ranks of a conscript Service. I agree, too, that officers and N.C.O.s should be trained in the art of leadership and in the firm but humane administration of discipline.

Mr. Metcalf claims that many ACH/GD N.C.O.s possessed intellect as high as that of most Group I tradesmen. I can only ask, "Why did they remain ACH/GDs when travelling boards were scouring the country endeavouring to find ACHs capable of learning a trade, and when Group V pay was so poor?"

The majority of wartime airmen never met these ACHs of high intellectual standard. Typical of most ACH N.C.O.s was the sergeant who asked, quite seriously, in my presence, "Where is Salisbury Plain?"

Typical also was the ACH/GD Station Warrant Officer who placed a notice on a sergeants' (i.e., Senior N.C.O.s) mess notice board and saw, a few hours later, the comment: "Spelling 10 marks, grammar 4." At this station each sergeant took in turn the duty of marching the men to work, the rest of the sergeants cycling each way. Now was issued the order that all sergeants were to march daily to work with the men.

This was the S.W.O.'s "comeback" for the schoolmasterly comment, which he blamed on an unidentifiable sergeant. Subsequently the real originator of the joke confessed—he was a senior Group I Warrant Officer!

The remark that G.D. N.C.O.s were the curse of the R.A.F. was made in my hearing by a Group I regular N.C.O., who was a technical instructor of high intelligence. Subsequent comments by instructors during my fitter's course confirmed this as their opinion of their Group V colleagues.

For years I read happily most worth-while books and articles on the R.N.A.S., R.F.C., and R.A.F., and I used to approve the theory of the first adjutant of the R.F.C., the late Major Barrington-Kennett, that the R.F.C. should be "as smart as the Guards and as handy as the Navy."

Now I am less certain. With the increasing complication of modern aircraft, more than handiness is required. With the increasing education and self-reliance of the modern airman, something more than the military automaton of 1912 is necessary also.

Lord Trenchard, five times creator of British air supremacy, said once that the R.A.F. would not come into its own until a Cranwell cadet had risen to be Chief of the Air Staff. As that time approaches, may the R.A.F. evolve its own traditions and discipline as a third but pre-eminent Service. To achieve that end something better than the ACH/GD administrator is required.

F. A. S. BROWN.

London, N.5.

THE LATE ROBERT LINDSAY-NEALE
An Appreciation

ROBERT LINDSAY-NEALE, the chief test pilot of Boulton Paul, has just departed from us and gone the way many of the test pilots unfortunately go. He was one of the very best test pilots this country has ever had, and his technical knowledge was extraordinary. Much is owed to him.

I think it is fitting to state that it was he who first flew the Mamba turboprop in the Balliol. He also, quite recently, dived the Balliol to over 470 m.p.h., a previously unimagined performance for a side-by-side trainer. His aerobatic exhibitions at the Radlett S.B.A.C. Display in 1947 were unforgettable. In foreign countries they have been praised as exceptional.

Lindsay-Neale had suffered the loss of a leg through a motor-racing accident, and nobody would have thought that a one-legged pilot could put up such a show in a military multi-purpose trainer. He had amazingly quick reactions and an extremely fine feeling for control co-ordination.

In the years before the war he owned a Puss Moth, and as the moving spirit of Lindsay-Neale Aviation, Ltd., he did much free-lance test flying. He also sampled the de Havilland Comet racing monoplane with success, and he must have had an exceptionally wide flying and technical experience in those years. When the war came he sacrificed his business in order to take a flying part in the war effort. It was sad that the R.A.F. had no place for a pilot of such great qualities.

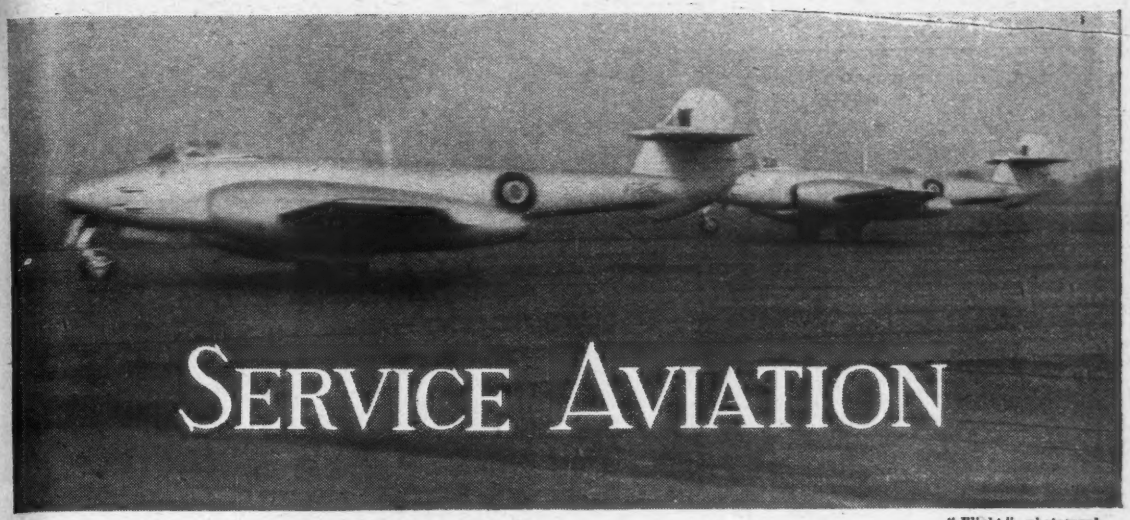
An extremely modest man, Lindsay-Neale has never had the public acknowledgment he deserved. The only exception was when he became one of the few pilots to have landed a fully loaded single-engined aircraft intact after the engine had suddenly detached itself from the airframe; news of this only leaked out months after the lucky event.

I ask you to accept this as a modest tribute to the memory of a great, enthusiastic and much-loved member of our flying community, who lost his life in the execution of his duty. All those who knew him feel that they have lost a friend.

Dunstable, Beds. A. R. WEYL, A.F.R.Ae.S.

FORTHCOMING EVENTS

Feb. 17th.—Royal Aeronautical Society: "Planned Servicing in the Royal Air Force," S/L. E. A. Harrop, O.B.E., A.F.R.Ae.S.
Feb. 17th.—R.Ae.S. (Coventry) "The London-Sydney Air Route," C. H. Jackson.
Feb. 18th.—Institute of Navigation: "Operational Aspects of Marine Radar." A Symposium of Papers. Chairman: Sir Robert Watson-Watt, C.B., F.R.S.
Feb. 22nd.—R.Ae.S. (Belfast): Lecturettes and Informal Discussion.
Feb. 24th.—R.Ae.S. (Manchester) "The Development of the Mamba Engine," A. S. Lindsey, M.A., A.F.R.Ae.S.
Feb. 24th.—Royal Aeronautical Society: "Flutter and Stability," Prof. W. J. Duncan, B.Sc., F.R.Ae.S., M.I.Mech.E., F.R.S.
Feb. 24th.—R.Ae.S. (Isle of Wight) "Naval Aircraft," Lt. Cdr. E. M. Brown, O.B.E., D.F.C., M.A., A.F.R.Ae.S.
Feb. 26th.—Society of Licensed Aircraft Engineers (South Eastern Area) "Airframe Repairs," G. C. Banks.
Feb. 26th.—Helicopter Association of Gt. Britain: "Helicopter Transmission Systems," K. Watson, A.R.Ae.S.
Feb. 28th.—Institute of Public Administration: "The British Overseas Airways Corporation," J. O. Blair-Cunynghame.
Mar. 2nd.—R.Ae.S. (Luton) "Evolution of a Modern Aeroplane," Prof. R. L. Lickley, B.Sc., D.I.C., F.R.Ae.S.
Mar. 2nd.—R.Ae.S. (Graduates' and Students' Section) "The Development of the Brabazon I," G. P. Hebden, A.F.R.Ae.S.
Mar. 3rd.—R.Ae.S. (Gloucester and Cheltenham) "Electrical Aircraft Instruments," E. B. Moss, B.Sc., F.Inst.P., M.I. Mech.E. *At Gloucester.*
Mar. 5th.—Rugby Football, Twickenham, Royal Navy *versus* The Army.
Mar. 5th.—Royal Aeronautical Society: Full day Discussion on Air Safety.
Mar. 7th.—R.Ae.S. (Derby) "Helicopters—The Technical Point of View," Capt. R. N. Liptrot, C.B.E., B.A.
Mar. 8th.—R.Ae.S. (Southampton) Lecture by A. G. Pugsley, O.B.E., D.Sc.
Mar. 9th.—R.Ae.S. (Belfast): "Helicopter Design," T. E. Goligher, B.Sc., D.I.C., A.F.R.Ae.S.
Mar. 9th.—R.Ae.S. (Weybridge): "Air Force Requirements and their Origin," Air-Cdre. G. W. Tuttle, C.B., C.B.E., D.F.C.
Mar. 9th.—R.Ae.S. (Preston): "Recent Developments in Aircraft Production Engineering." Professor J. V. Connolly, B.E., A.F.R.Ae.S.
Mar. 9th.—R.Ae.S. (Leicester) "Charter Flying" Sqdn. Ldr. Wright.
Mar. 10th.—R.Ae.S. (Isle of Wight) Lecture by N. E. Rowe, C.B.E., D.I.C., B.Sc., F.R.Ae.S. (Provisional).
Mar. 10th.—Timber Development Association: "Modern Adhesives—Their Present and Future Application." D. A. Hubbard.



SERVICE AVIATION

"Flight" photograph.

BIG NOISES: With two Derwent 5s delivering over 7,000 lb static thrust, the Meteor 4 at take-off produces one of the most impressive and business-like sounds ever heard on an airfield. Two Meteor 4s of a No.12 Group squadron are seen just before "unsticking."

Northern Fly-past

BRIEF reference was made in the Feb. 10th issue of *Flight* to the recruiting drive then in progress to obtain ex-maintenance rating volunteers for the Lancashire and Cheshire R.N.V.R. Air Squadron—No. 1831. Last Saturday morning at R.N.A.S. Stretton, near Warrington, where the Squadron is based, we learned something of the week's activities and of the fly-past which was to conclude them that afternoon.

The recruiting week began on Sunday, February 6th, with a visit to H.M.S. *Blackcap* (Stretton's official title) by the Lord Mayor of Manchester, who met members of the Squadron and witnessed both training and recreational activity. After a march-past in Manchester by some 300 officers, ratings and Wrens from Stretton, indoor and outdoor static exhibitions featuring Naval/air equipment were opened for public inspection in shop windows and on bombed sites.

Leaden skies, a bitter wind and driving rain earlier on Saturday morning had promised little for the prospects of the fly-past after lunch. It was explained, however, at Stretton, that these conditions were the results of a cold front, forecast by "met.," and that reasonable flying weather was expected for the afternoon. Squadron pilots reported that patches of cloudless sky existed outside the Manchester-Warrington area.

The weather did brighten before lunch, and four "1831" Seafire 17s standing in readiness on the runway were joined by ten R.Aux.A.F. Spitfires from Ringway and Hooton Park, including two reserve aircraft. It was mentioned that a further four "Spits" from Ringway and four from Woodvale would rendezvous over Stretton at take-off time, bringing the fly-past force to a total of twenty aircraft.

Briefing was conducted after lunch by Lt. Cdr. R. I. Gilchrist, R.N.V.R., Commander of the Seafire Squadron. Take-off was to be at 13.45 hours, and the aircraft would take 15 minutes to form up. Having taken up course the formation would fly over Stretton at 14.00 hours, turning in above Woodford to make the first run over Manchester. It was intended to "show the flag" over Tyldsley, Bolton, Bury, Rochdale and Oldham before returning via Manchester, North Altrincham, Warrington and the Mersey.

In organizing the fly-past it was planned that the formation would be seen by as many people as possible, and by its appearance over Manchester football ground, just before the beginning of the Manchester v. Yeovil game, much was achieved towards this end. Some 80,000 spectators were present, and the purpose of the flight and mention of the units composing the formation were broadcast through an R/T control van stationed on the pitch.

"Stretton Squadron," the call-sign adopted for the formation, was to consist of five flights at 200ft intervals, stepped down from the leading flight, each flight being of four aircraft, in "finger-four" formation, with a span distance between machines. Lt. Cdr. Gilchrist was to lead the formation in the first of four Seafires composing "Red" flight. The R.Aux.A.F.'s 16 Spitfires were to follow in "Green" flight, No. 610 (County of Chester) Squadron; "Black" No. 611 (West Lancashire) Squadron; and "Blue" and "Yellow," both from No. 613 (East Lancashire) Squadron.

Briefing was concluded with very few minutes to spare, and following the resultant "semi-scramble" 14 Merlins and Griffons were soon running. Every engine responded immediately to its Coffman starter. Take-off was equally snappy, with aircraft leaving in pairs at ten-second intervals.

From one of No. 1831 Squadron's training aircraft —a Harvard 2—we were privileged to observe the twenty fighters during the operation, as they passed over Manchester at 2,000ft and 220 knots, keeping excellent formation. The Harvard's speed limitations made further observation difficult, despite careful "corner-cutting" but it was later learned that the operation had gone completely according to plan. During our short visit we saw much evidence of the efficiency and excellent spirit prevailing among the Northern "week-end" air squadrons, both Naval and R.Aux.A.F., and a pleasing example of friendly co-operation between the two Services.

Royal Air Force and Naval Aviation News and Announcements

R.A.F. Appointments

AFTER having been chairman for the past year of an Air Ministry committee which has been considering the future structure of airmen's trades, A. Cdre. W. L. Freebody, C.B.E., A.F.C., has taken up another Ministry post this week as Director of Technical Policy. A. Cdre. Freebody, who was commissioned from Cranwell in 1926, served as Senior Engineer Officer at the headquarters of Fighter Command, the Allied Expeditionary Air Force H.Q., and Base Air Forces, South East Asia, during the war, and was also A.O.C. No. 226 Group India.

Scottish Forest Survey

A DETACHMENT from the R.A.F. Central Photographic Establishment, Benson, is going north this summer to continue the photographic survey work over Scotland which has been in progress for the past two years. An important part of its flying programme is the project for infra-red photography of forests in the Strathyre-Loch Ard area. This special survey is being undertaken for the Forestry Commission on the suggestion of the Department of Health for Scotland. It is at present experimental, but it is expected that the use of infra-red photography from the air should enable the Forestry Commission to make a more exact classification of trees. At present it is possible to make a general classification from ordinary photographs, sufficient to distinguish trees as either coniferous or deciduous. But infra-red photographs are expected to show the state of growth of trees and to distinguish tree types within the

Service Aviation . . . . .

coniferous or deciduous groups. Mosquitoes will probably be selected for the survey.

R.A.F. at the "Ideal Home"

A "FLIGHT" in a Meteor, and a fifteen-minute re-enactment of the scene in Fighter Command Operations Room, at the peak of the Battle of Britain, will be two of the highlights of the R.A.F. stands at the Ideal Home Exhibition at Olympia, opening on March 1st. Spare-time service in the Auxiliary and Reserve forces of the R.A.F. will be the theme of the R.A.F. exhibits.

Visitors will be able to sit in the cockpit of a Meteor, handle the controls, and be given the impression of the earth moving beneath them. They will be able to control a model aircraft by an automatic pilot, operate a gyro gunsight training set as used by pilots and gunners, and see a "Gee" radar set in action as in an aircraft. A Bofors A.-A. gun will be open to inspection, and an electrically operated 0.5 Browning machine gun and a sectioned working model of an aerial camera will also be on show.

Winter Sunshine

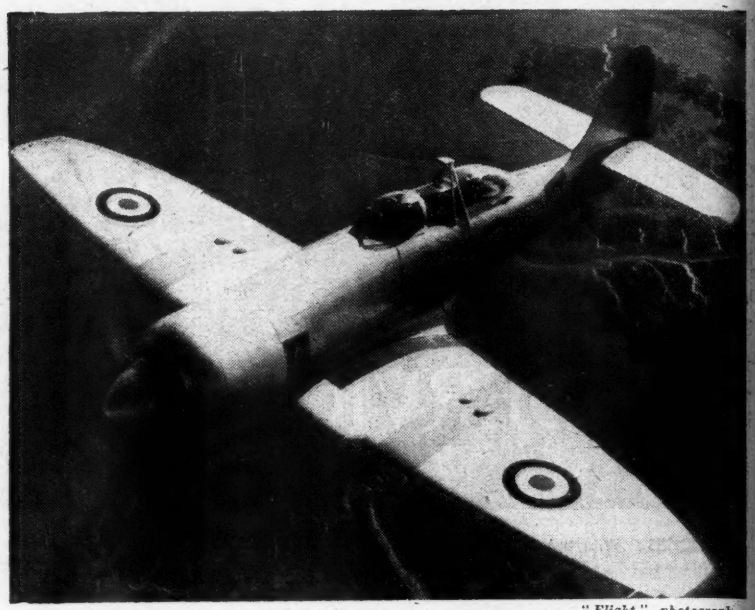
ELEVEN Bomber Command Lincolns left Waddington on January 31st on "Exercise Sunray," the Command's regular monthly training flight to the Middle East. Replacing 12 Lincolns now returning, they will spend a month in the Canal Zone of Egypt.

R.A.F. Pilot Decorated

THE King has been graciously pleased to approve the award of the British Empire Medal to Pilot II Basil George Ashton, Royal Air Force. The citation is as follows:

Whilst a pupil on No. 126 Survival and Rescue Course, Thorney Island, Plt. II Ashton was captain of an airborne lifeboat, which capsized in heavy breaking seas on Chichester Harbour bar, on January 8th, 1948. All the occupants were thrown out, one being drowned. Plt. II Ashton was the first to climb aboard the upturned boat, but he left it again to rescue three other members of the crew who were struggling to reach it. The waves were so large that two of his comrades were washed back again into the sea, Ashton helping in their final rescue. All were exhausted. The incident called for resource and personal courage of a high degree under the extremely dangerous conditions prevailing. Had Plt. II Ashton failed in these respects, all the occupants of the lifeboat might have been drowned. He risked his life to save others. His conduct and leadership as a trainee captain, without which this accident might well have had more serious results, were exemplary.

Now stationed at Benson, Plt. II Ashton is serving with a photographic reconnaissance squadron flying Mosquitoes and Ansons. He joined the R.A.F. in 1937 and trained as a pilot in 1943-44.



"Flight" photograph.

MILD FURY: Retaining the pleasant handling qualities and spirited performance of the fighter version, the Sea Fury Trainer is an excellent example of the now fashionable fighter-trainer conversion.

PRIZE-GIVING: At R.A.F. Station North Luffenham on February 8th, Lord Tedder presented Transport Command's Accident Prevention Trophy. G/C. M. H. Kelly (right) is seen receiving the award—a silver model of a Halifax—on behalf of the station.

R.A.F. Permanent Commissions

GENERAL DUTIES BRANCH.

Squadron Leaders: D. E. Cattell, H. L. Derwent, A.F.C., W. E. Farrow, A.F.C., I. L. M. Hallam, K. Jones, D.F.C., J. N. MacKenzie, D.F.C.

Flight Lieutenants: R. T. Duck, M. P. Fisher, D.F.C., K. Kingshott, D. W. McAdam, D.F.C., S. McCreith, A.F.C., R. J. W. Mason, T. P. Meyer, G. R. Muirhead, D.F.M., B. R. H. Munn, C. C. Povey, D.F.C., G. W. Salter, D.F.C., J. E. D. Taylor.

Flying Officers: W. Porter, A. C. Spencer.

Pilot Officer: G. Rafer.

TECHNICAL BRANCH.

Squadron Leader: R. F. Sparrow.

Flight Lieutenant: K. A. Young, D.F.C.

Flying Officers: P. J. Reen, B. M. Somerfield, P. K. Whitaker.

EQUIPMENT BRANCH.

Squadron Leader: P. J. Ash.

Flight Lieutenants: G. Richardson, R. G. T. Williams, S. F. Wood.

Flying Officers: A. W. Hay, H. J. Horner.

SECRETARIAL BRANCH.

Squadron Leaders: J. M. Anderson, A. Maddison, P. Raby.

Flight Lieutenants: R. E. G. Francis, J. E. Gibbs, D.F.C., D.F.M., T. L. Gillieson, R. K. Webb.

Flying Officers: N. J. P. Tull, R. S. F. Wright.

R.A.F. REGIMENT.

Flying Officers: G. E. Barrett, B. M. Gibson, J. D. Spurway, R. H. Todd.

AIRCRAFT CONTROL BRANCH.

Squadron Leader: A. R. Del. Inniss, D.F.C.

Flight Lieutenants: D. G. Bickford-Smith, G. M. I. Tweedie.

PHYSICAL FITNESS BRANCH.

Flight Lieutenant: J. W. A. McCarthy.

Reunion

ROYAL AIR FORCE Stations Hurn, Harwell, and Rivenhall, 38 Group Headquarters and Airborne Forces Old Comrades' Association announce the third annual reunion and general meeting at the Duke of York's Headquarters, Chelsea, on March 5th, 1949, at 6.30 p.m. Apply to Secretary, W. Scrivens, Esq., 54, Lombard Street, E.C.3.